Electrical World

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BETTER BUSINESS FOR CENTRAL STATIONS TO THE EXTENT OF MILLIONS OF DOLLARS IS POSSIBLE THROUGH THE COMPRO IDEA ON PAGE 9

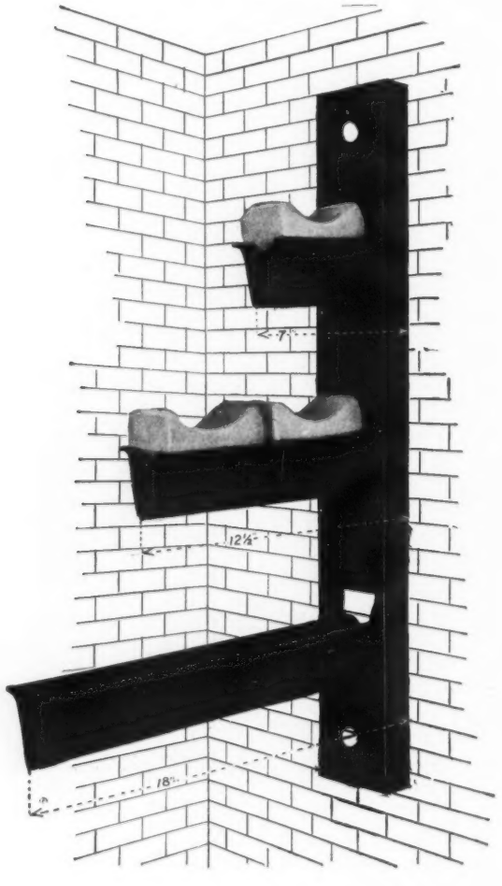
THE WADSWORTH ELECTRIC MFG. CO., INC., COVINGTON, KY.

BETTER BUSINESS NUMBER

METROPOLITAN
SUBWAY CABLE RACKS

Protect Your Cables

Against Burnouts and Electrolysis



Bulletin 9 tells the Story

METROPOLITAN DEVICE CORPORATION

1250 Atlantic Avenue, Brooklyn, N. Y.

Electrical World

New York, Saturday, October 8, 1921

The Individual Responsibility that Will Follow the Unemployment Conference

OUT of the unemployment conference at Washington comes already real inspiration for the country. Committees are still at work. Results have not yet been announced. But the record of the opening session alone has brought new confidence.

When President Harding pointed out in his opening address that the task was not "to solve the long-controverted problems of our social system" he spoke to the entire nation. There has been too much time and talk thrown away here on theoretical discussion. His admonition that "tonic from the public treasury . . . would bring a new cause of trouble rather than a source of cure" was surely merited. We have become too prone to look to Washington to ease our troubles from the public funds. Secretary Hoover crystallized the thinking of the conference by his statement that "the only remedy for unemployment is employment."

It was soon found that the first estimate of 5,735,000 unemployed was an exaggerated figure. The actual number probably is 3,750,000, of whom 1,500,000 are but the normally unemployed in ordinary times. The emergency therefore presents something more than 2,000,000 idle men and women throughout the country for whom jobs must be sought to relieve the situation. And employers must realize that the straight road to the employment of this labor can only be through providing work, not in Washington, but across the country, in the factories, shops, stores, offices, homes, the farms, highways, railways and construction jobs.

The conference is bringing us decision and direction. We shall have practical suggestions for the acceleration of state, county and municipal work, for advancing production, for rotating labor, for distributing the burden of unemployment and for other measures of relief. And what then? Employers of labor throughout the land must accept the judgment of the conference and do the job they recommend. We have been waiting on Washington. When the report is in the time for local action will have come.

The problems of unemployment and the relationships between labor and capital are national issues only in their broader aspects. The points of contact are all local. The responsibility for constructive thinking, for fair dealing and for actual achievement in the working out of this great social and economic evolution rests not on the government but on the individual — employer and employee — and on the local leaders of them both.

The electrical industry must not delay in assuming its full share of obligation. We are both interested and involved. We must be ready when the conference points the way.

John Barnes Miller

President of one of the pioneer public service corporations whose scope of development and ideals of service have had a national influence on the engineering and business building phases of central-station work.

IN THE development of electric service in the West John B. Miller has been a leader for more than twenty-five years. When he became associated with the company which he now heads as president the present utilization of the water powers of California was a vision beyond the comprehension of all save a few, owing to the huge expenditures that were involved and the apparent lack of demand sufficient to earn the required return. Through sheer determination and undaunted faith in the future that would come to southern California from the application of brains and capital in the development of a rich virgin soil, he has in a short period of time been able to justify in a practical way the confidence that was placed in his business judgment. Today the Southern California Edison Company furnishes light and power to 250,000 customers throughout the southern section of the State and wholesales energy to numerous municipalities and other smaller corporations for redistribution. It has absorbed about thirty public service corporations and financed its developments on a vast partnership basis, more than 35,000 individuals being now owners of its securities.

As an executive Mr. Miller has a faculty for selecting and developing capable and loyal associates both in engineering and executive departments, men who have not only contributed to the upbuilding of the company's affairs but are also able to extend their influence into the national affairs of the industry West and East. In the field of long-distance high-voltage transmission Southern California Edison engineers have done much pioneer work under physical difficulties that are equaled nowhere in this country, work that in magnitude could only be accomplished with the full co-operation and confidence of the broad-minded leader under whom they have worked.

Mr. Miller was born at Port Huron, Mich., Oct. 23, 1869. He received his education at the Ann Arbor High School and the University of Michigan, and spent the first six years of his business career in Louisiana and Michigan. In 1896 he went to California and became associated with the electric light and power business on Feb. 1, 1897, in Los Angeles. A year before the West Side Lighting Company had purchased the steam plant then known as Los Angeles No. 1, with a generator rating of 100 kw., giving the entire system a generating capacity of 150 kw. In 1898 the directors of the company combined the West Side Lighting Company interests with the Redlands Electric Light & Power Company under the new name of the Edison Electric Company, and Mr. Miller was elected president in 1901. At this time the system of the new organization had a generating capacity of 4,000 kw., of which 3,850 kw. was water power. Plants were then built rapidly one after another, and in 1909, when the Edison Electric Company was reincorporated under the name of the Southern California Edison Company and the beginning of the present system—which had a generator rating of 222,820 kw. on the first of the year and an output for 1920 of 1,079,474,901 kw.-hr.—was well under way, Mr. Miller was elected president of the new organization. This position he held until 1918, when he was elected chairman of the board. Since March, 1920, he has carried the responsibilities of both president and chairman of the board. Mr. Miller is also associated with a number of other large business organizations.

Throughout his successful business career Mr. Miller has earned the esteem and confidence of other leaders in the electrical development of the West, where the spirit of co-operation and united effort in building for the future is a recognized constructive force in all branches of industry, irrespective of sectional lines or the limits of immediate interests.

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The Most Important Question About Utility Securities

UNDOUBTEDLY the most engrossing issue before the central-station company today is the sale of utility securities to the public. There is pressing need of funds, and these stock-selling campaigns to customers are opening up a vast new source of capital. This is good. But there is still another need, even more urgent, the need of friends for everything electrical, and customer ownership is massing an army of such supporters and defenders of the public service company. This is better. The development of this personal contact and this feeling of sympathetic responsibility among large numbers of the people offers perhaps the most important opportunity before the entire industry today.

But there is another important matter in this connection that is not being taken up. It involves a question that every electrical man should be expected to answer, and that question is: "How many electrical securities have *you* invested in?" For the sooner every central-station employee becomes a shareholder in his company the quicker shall we have an end to friction with the public and the easier will selling be. And the sooner contractors and dealers in every town buy stock in the local electric light and power company and electric light and power company men put money into contracting and dealer stores, the quicker will trade relationship be entirely happy.

So while the companies are selling stock they should sell some to themselves. There is no better slogan for us all than this: "Invest your money in the electrical business."

Nebraska City Finds a Way Out

THE method by which a recent telephone franchise controversy at Alliance, Neb., was settled affords a ray of hope to those pessimists who can see only the dark side of the public relations problem. The company had been operating for two years without a franchise and had in at least one case been refused a franchise by vote of the people, after a bitter fight. With the appointment of a city manager a few months ago the question came up for settlement and the franchise was worked out and granted. The unusual thing about the proceeding was the frank and fearless way in which City Manager Kemmish in a public statement told the citizens the facts in a situation in which the city had no power to establish its own telephone service or regulate rates.

In that statement also Mr. Kemmish told the city that to establish competitive service would be futile even if the authorities could grant as many franchises as they saw fit. The folly of driving out a company with an established business was clearly set forth. This lack of effort to make political capital out of a situation of the sort that the politician ordinarily delights in is refreshing. Whatever may be the differences of opinion, controversies of this kind can be settled if both parties are willing to face all the facts and admit that there is a way of treating everybody fairly. "Where there is a will there is a way" is a trite observation, but none the less it is unfortunately the case that in too many instances impossible situations are caused by the lack of "will" on the part of one or both of the interested parties.

Reward for Efficient Operation of Utilities

WE HAVE commented now and then on the necessity for holding out some incentive to the management of electric public utilities as a reward for efficient operation. It is surely in the interest of both the consumer and the utility that energy be produced at the minimum of cost consistent with good service. If this is to be brought about, sufficient inducement should be given the management of public utilities to operate them as economically and as efficiently as possible; otherwise, with a regulated monopoly limited to a fixed rate of return, the tendency toward complacency would be as pronounced as it is in government and municipal work.

Without real incentive to give our best initiative is lacking and progress is dwarfed. It is of great moment, therefore, that the Transit Commission which is endeavoring to bring order out of chaos in the street-railway situation of New York City recognizes this principle and has incorporated it in its tentative report on the transit situation of that city. This should stiffen the backbone of some regulatory bodies which accept the idea but fear to make it effective. In essence it is the old "London sliding scale," and its revival and application to so important a public utility situation as that existing in the metropolis of the Western Hemisphere should give encouragement to public utility managers everywhere to do their utmost to bring down the cost of service, confident that their labors shall not go unrewarded. Although the report of the Transit Commission is applicable only to the street railways of New York City, the principle which it enunciates is not so restrictive. This is evident from the text, which reads as follows:

"In order to provide an incentive for efficient and economical management, there shall be set aside each year by the board of control out of the surplus earnings of the unified system, after the payment of all obligations and the maintenance of the barometer fund, a sum to be distributed or used for the joint benefit of the operating personnel of the unified system and

the holders of the consolidated company's bonds. This fund, within the limits of the available surplus, shall, for the purpose of computing allotments prescribed, equal 3 per cent interest on the purchase-money bonds issued by the consolidated company. When the amount so available has been determined by the board of control it shall be allocated, one-half for the benefit of the operating personnel as hereinafter indicated and one-half for the payment of additional interest upon the outstanding purchase-money bonds, but subject to the condition that with any increase or decrease of fare above or below the rate of 5 cents, such funds shall be decreased or increased, as the case may be, on the basis of 1 per cent interest on the bonds with each cent of fare variation."

New Considerations in Peak-Load Discussions

CONSIDERABLE confusion is evident in many discussions on the floor of conventions when the subject of residence consumers' loads on the peak is discussed. This is sometimes due to the fact that we are in a transition period. Formerly the peak load was universally experienced in the evening hours and was due to lighting requirements. This is no longer true. The rapidly growing industrial and residence loads are shifting the peak to the daylight hours and very frequently to the morning hours. In a recent discussion revolving around the effect of the electric range on the peak load it developed that a plant concerned experienced its peak in the evening hours. As the range peak came at the same time, the coincidence was decidedly pertinent in the discussion but decidedly misleading to the man who has to provide for new conditions of growing daylight peaks.

The shifting of the peak hours to the daytime is playing havoc with many of the timeworn arguments about the effect of certain household equipment on the investment required to carry the consumers' demands. Some of the appliances, the flatiron and washing machine for example, are showing a decided peak load of their own in the early days of the week. These peaks coincide with the industrial load peak and help to make it a bigger factor in the investment required in the plant and distribution system. In many plants the range peaks in the evening are of little consequence in determining needed plant capacity because the resistance peak load does not now come at that time.

The problem is not the simple one of disregarding the range load as a peak load because the range peak does occur when the customers' lighting needs are greatest and therefore does affect the investment required in the distribution system. This is only one instance, but the problem presents itself in similar form when making plans to increase the load of motor-operated appliances in the home. It is becoming necessary, therefore, in discussions of the rate problem to guard more carefully against mistakes in the use of the term "peak load." It will also become increasingly necessary in the future to consider the effect of various peaks on various portions of the system as a whole and to watch the power factor of circuits serving large numbers of home devices driven by small, lightly loaded induction motors. The fast-growing loads of these motor-driven appliances in metropolitan residential centers emphasize the need for an extensive line of synchronous motors in the smaller range of sizes.

An Opportunity for the Electric Storage-Battery Bus

IN WORKING out the problem of city transportation by buses the manufacturers of gasoline vehicles have again invaded the field of the electrically propelled road vehicle in spite of the fact that in short-haul, frequent-stop service the storage-battery truck has more than demonstrated its economy and its engineering has reached a period of standardization that accommodates wide ranges of loads. In the handling of traffic over paved city streets or well-maintained main thoroughfares in areas of light traffic and in extensions of existing electric street railways no new problems are presented to the electric storage-battery truck. The main difficulty seems to center about that indeterminable factor in commercial exploitation which manufacturers of electric vehicles have been slow to learn even in the general haulage and delivery field. Electric railway men are still looking for a solution of the problems that have tended to disintegrate that industry, and for a time at least the bus seems to meet the emergency requirements in those communities where traffic is comparatively light and buses can be used as auxiliary feeders to existing lines.

Besides offering a new field for the electric bus, this situation presents a new opportunity to the light and power company that operates the railways to establish charging and maintenance facilities that will help to promote the more extensive use of the electric truck for general haulage by other businesses in the community. The lack of such service facilities manned with expert battery men has been the only serious drawback to the electric vehicle in the past, when only a few trucks have been required by any one concern and the establishing of individual maintenance stations has not seemed justifiable. If the local utility should take advantage of this situation, there is the business possibility of creating a revenue that would partially offset the expense of maintaining the electric buses used in a city transportation system and thus establish the electric vehicle within the electric industry from a public service standpoint.

Applied Illuminating Engineering Deserves More Consideration

FROM the opto-physical or purely scientific viewpoint of lighting and illumination the activities of the Illuminating Engineering Society are invaluable. If it were not for the classical researches reported before that organization, there would be no single place toward which to look for scientific guidance on the all-important problem of illumination. None the less, it is unfortunate that the valuable information presented audibly reaches so few ears and that it is then stored away in printed form on reference shelves which are consulted all too infrequently.

To us it seems that the remedy is to make the presentation of papers on commercial applications of illuminating engineering a more important part of the society's meetings and then arrange for joint meetings with other societies representing architects, contractors, fixture dealers and men of similar pursuits. Although this has been done spasmodically before, it could profitably be made a regular practice. By featuring the applied-engineering papers, which always have a wider appeal, and making an honest effort to interest the membership of other societies, a larger number of per-

sons can be made to think in terms of lighting fundamentals and may even become interested in the more scientific discussions of the Illuminating Engineering Society.

The lighting code, the paper on relation of highway illumination to accidents and that on lighting public buildings, presented at the annual convention of the Illuminating Engineering Society last week in Rochester, N. Y., are examples of the type of information which has widespread interest.

Is Inductive-Interference Work Still Drifting?

ONE more step that will aid in the establishment of the California inductive-interference rules as the final answer to the problem they concern has been taken in the recent report of the inductive-interference committee of the telephone and telegraph section of the American Railway Association. The report is based on the work of the California committee, though it does not go to the extent of suggesting remedial measures. Constant reference is made to General Order No. 52 of the Railroad Commission of the State of California. On the committee that presented the report are two telephone representatives who had intimate contact with the California work. There was no representation from the National Electric Light Association except the presence of one manufacturers' representative who is a member of the inductive-interference committee of that association.

Unless the central-station executives awaken to the real situation and get back of the work of the National Electric Light Association more effectively than they have yet done the result of the present negotiations is a foregone conclusion. That this should be so is not strange. The American Bell telephone interests have carried on a consistent and increasingly intensive study of the subject until today they have not only a thoroughly competent research organization but have educated their operating organizations to a thorough appreciation of the problem they are facing.

The telephone interests are not to be criticised for this organization. On the contrary, they should be commended for the foresight that their executives have exercised in anticipating the problem and preparing to meet it.

The activities of the National Electric Light Association, during the last year particularly, are in the right direction and, considering the handicap under which the joint and inductive-interference committees and the small headquarters force have labored, the work accomplished has been far more than any one had a right to expect. This has been due to faithful and unselfish overwork on the part of individuals. The whole handicap is the product of the executive attitude that refused help to the California power interests when the California study was at its most critical point and left a few California companies to carry the burden as best they could. Unless the executive forces of the central-station interests can persuade themselves to back the work with something like the enthusiasm displayed by the executives of the telephone interests it is only a question of months until the men carrying the burden of the study for the National Electric Light Association will find themselves in the same position in which the association found itself in 1915 when it faced the safety code controversy.

Getting back of the work effectively means a much heavier expenditure than has yet been suggested. The organization constantly employed must be large enough to study all phases of the technical problems involved both from telephone and electric service standpoints. That force does not yet exist, and, worse than that, the men to make it up must be educated. The force must also undertake among the power men to a much greater degree the educational work that has already been largely done among the telephone operating force. It must be large enough to co-ordinate the work of the manufacturing and university research laboratories that are available for the studies. This is particularly important because it will result in throwing open the study to the general electrical engineering public and thus obviate the criticism that the knowledge needed in the solution of the problem is centralized in a few hands. It is not fair to the telephone interests to leave the entire burden with them. Much has been done, but a real task still remains for which sufficient funds from the power companies have not yet been made available.

The present executive attitude of "let George do it" can lead only to delay in the ultimate solution of the inductive-interference problem and interminable controversy in arriving at the fundamentals on which it must be based.

Injustice of Large Cash Depreciation Fund

AT A RECENT hearing before the Oklahoma commission and now again before the District of Columbia commission the power companies have fought to get away from the timeworn practice of setting aside a depreciation fund based on probable life. Here is a cash fund growing yearly and remaining for the most part idle. If it earns any interest, it must be from the utility itself. From time to time replacements occur or a unit is taken out of service and the fund is drawn upon. The rest of the time the fund simply grows larger and larger each month out of earnings and earns nothing for itself. It assumes that a generator has a certain life and collects at that rate. It happens quite frequently that the generator at the end of its supposed life is running very efficiently and continues to do so for many more years. By this time the unit has been thoroughly depreciated and can be written off the books, although it is as hale and hearty as ever.

The evil of amassing such a large fund of idle cash and basing its collection on probable life has been apparent for some time. The alternative now advanced seems so sensible, practicable and fair that the wonder is it has not been put into practice before. It is proposed to set aside monthly a small sum, a little larger than the average maintenance account. This is to take care of recurring depreciation and maintenance and leave just enough over to absorb any undue charge that might come. In this way it is hoped to prevent severe fluctuation in operating expense due to this item.

It is hardly conceivable that the property of any company will depreciate all at once. Rather is it true that it will have a great spread. Why, then, have a fund large enough to take care of depreciation for the whole plant at once? Why not have a fund sufficient, with a factor of safety, to meet depreciation obligations as they occur?

Highway Illumination Is an Important and Relatively Untouched Field of Lighting

ANY ONE who has driven an automobile will appreciate the value of any form of road illumination which will eliminate the necessity of brilliant headlights, and the usually attending glare, which are often the cause of night accidents. This function is remarkably well fulfilled by the installation shown, in which the light is so directed that the lamps produce the desired illumination without subjecting drivers to bewildering glare. (See the fixture employed in inset at left). Several installations of this character have already been made for determining the advantages of this system and the experience is inducing other communities to install similar equipment. When it is considered that nearly 18 per cent of the night highway accidents can be attributed to improper or inadequate lighting, according to data presented before the Illuminating Engineering Society last week, it behooves each engineer to see that something is done to remedy local conditions. Some day it is hoped that the responsibility for providing highway light that will assure safety of traffic will be assumed by the state or municipality since it is just as important as a smooth road surface. Until then the necessity for good lighting must be constantly reiterated

Problems that Central-Station Companies Are Studying

N. E. L. A. President Points to Essential Future Developments and Emphasizes the Need for Obtaining Capital Requirements from Small Investors and the Importance of Utilities Telling Their Own Story More Widely and Actively Pushing the Sale of Convenience Appliances

By MILAN R. BUMP
President National Electric Light Association and Chief Engineer Henry L Doherty & Company

MILAN R. BUMP

THE electric utilities of the country as a whole are having a generally satisfactory year from the standpoint of net earnings. Lower prices for materials, together with changes in load conditions, have in a large measure offset the temporary lessening of the revenue from industrial customers. In fact, some companies will undoubtedly have their best showing in 1921. The widespread development of the use of labor-saving appliances is having a marked effect in maintaining domestic consumption of electricity.

The field for electrical development is so great that there seems to be no possibility for overgrowth. The normal increase in the demand for service will require an expenditure of approximately $1,000,000,000 annually over the next few years to come.

When it is considered that the electrification of steam railroads has scarcely begun, that less than half of the homes in America are as yet wired, and that a large percentage of the industries of the country are still operated without the benefit of central-station power, it can be seen that the field for development is tremendous, even if general industrial conditions should be somewhat subnormal during that period.

The feeling is widespread in the industry that developments should continue. A possible drawback lies in the existing tax laws, which have removed for the present the large investor, who for self-protection must put his available funds into tax-free securities. It is the belief of many in our industry that the securities of public utility companies, on account of the fact that they are limited as to earnings, should enjoy tax-exemption privileges as do municipal securities.

GREAT CONFIDENCE IN THE INDUSTRY

My general feeling, based upon a survey of reports to National Electric Light Association headquarters, is one of great confidence in the industry. I sincerely believe that, through our good-will campaign and through the co-operation of all branches of the industry, the electric public utilities at least are coming to the position where their securities will be entitled to first rank among corporate issues. This will mean that if there is money available for any corporate use, the electric utilities can get at least their share of it and can continue the growth that is so essential to the welfare of the industry as a whole.

According to my best belief, the present state of development of the electrical industry covers not more than 10 per cent of its possible field. Any talk, therefore, of overbuilding as far as central stations are concerned is idle, and there is no utility in the country which in my opinion does not face the problem of more than doubling its capacity within the next ten years. This being the case, the fundamental duties of our association and of the industry seem to be, first, to build up the necessary good will to safeguard our investments and to make the sale of our securities possible, and, second, to continue the development of our facilities with the same aggressiveness that has prevailed in past years, with the knowledge and belief that the progress of the nation is in a large measure dependent upon the progress of the electrical industry.

CUSTOMERS' OWNERSHIP PROGRAM

In my opinion, the most important new work of the year is embraced in the program undertaken by the new committee on customers' ownership activities. One of the outstanding contributions of Martin Insull's administration was the starting of the nation-wide good-will campaign. Our duty during the present administration lies in "carrying on" in this respect.

Until recently the cost of money has been too high to permit large expansion. Under the various regulatory laws, the return is usually limited to not more than 8 per cent, but it is my opinion that the cost

of money is on the decline and will soon reach a figure which the average utility company can afford to pay. There are far too few definite data as to the actual cost of customers' ownership stock-selling campaigns, and one of the duties of the new committee will be to develop information along this line. Reports have reached me of campaigns where the cost has been as little as three points and of others where the cost has been as high as six points. In every instance, however, it has been conclusively shown that the cost of selling has been less than the discount which the bankers and brokers would have required to handle the same distribution of securities.

I believe our new committee will recommend certain fundamentals to be observed in all customers' ownership campaigns, the primary fundamental being the safety of the securities offered to the local stockholders. Great harm might be done where dividends were promised and the promise not fulfilled, and failures of this kind would naturally hurt the entire movement. In every instance the company should strive to sell securities to a maximum number of small holders rather than to continue to load up present holders with stock that is available. The wider the diversity the greater the success of the movement.

Our new work will center largely on customers' ownership activities as representing the most feasible and possible field for the securing of funds essential to the development of the industry. I feel that the various arguments in favor of this step are so well known that it would be mere reiteration to enumerate them here, but in my opinion the ELECTRICAL WORLD could perform no greater service than to continue in each issue to feature customers' ownership in some form and to urge further activity along these lines. The funds rendered available by these activities will be spent by the public utilities and will mean business for the manufacturers, jobbers and contractor-dealers. They are therefore vitally interested in the success of the movement as a movement to build up a volume of business in the various branches of the industry. From the standpoint of promoting proper public relations, no other step has ever approached customers' ownership in importance.

If the Interborough Rapid Transit Company in New York City had an army of 200,000 stockholders scattered over that great city today, its position would be very different from what it is. The same thing holds true of the small utilities in every hamlet in the country. I have heard recently of numerous very interesting customers' ownership campaigns in some of the smaller cities, such as South Bend, Ind.; Beloit, Wis.; Wausau, Wis.; Oklahoma City, etc. Stories of such campaigns give confidence to operators in other small cities. The feeling is widespread in the industry that the continued financing of needed developments by utility companies will also result in producing a satisfactory volume of business for the manufacturer, contractor-dealer and jobber.

PROMOTION AND SALE OF APPLIANCES

In my opinion, it is essential that central-station companies engage in the sale of appliances, but in doing so they should in every instance co-operate with the local contractor-dealers and jobbers and sell appliances on the basis of such a fair margin of profit as will enable the jobbers and contractor-dealers to live and prosper. There are altogether too few data as to what the actual cost of selling appliances is, but it is my opinion that the biggest need of today is a revamping of manufacturers' list prices, permitting a greater spread between list prices and net wholesale prices, because the margin today in many instances is entirely too small for the central-station company or dealer to work within, and it is almost impossible to sell appliances in big volumes at prices above manufacturers' lists.

The Russell-Berger data presented at the Spring Lake (N. J.) meeting of the Association of Edison Illuminating Companies and published in the ELECTRICAL WORLD last week is indeed most interesting, but it is not complete. I believe that it should awaken every company to the necessity for further study along this line, and I am going to recommend to the Commercial Section of the association that it endeavor to push these studies as rapidly as possible.

I am a firm believer in the necessity of the central-station companies' taking up and pioneering new appliances and assisting in promoting the use of such appliances. From a selfish standpoint they should, of course, promote such appliances as make the fullest use of their service, therefore yielding the greatest revenue to them. On the other hand, with a well-developed sales organization, any appliance that can be handled at a profit to help carry the overhead expense of the organization should, in my opinion, be handled. What we really need today is the further development of the long-hour use appliances, such as the small refrigerating machines. With reference to the sale of those appliances for which there is a popular demand for special rates, I am of the opinion that it never pays to establish rates lower than can assuredly be maintained as the load develops. In other words, it is entirely a mistake in policy to adopt a special range rate unless it is fixed at a basis which is profitable to the company and can be maintained as the load develops.

THE NEED FOR TELLING UTILITIES' OWN STORY

Committees on public information are being formed in the various states, and I believe this movement should extend into every state and section of the country. The results already attained by the Illinois committee and the work so capably carried on by other committees, notably the Oklahoma committee, amply justify the continuance of the effort. To my mind, the greatest failure chargeable to the utilities in the past has been their failure to tell their own story.

In all this work I am strongly committed to the elimination of a duplication of effort along either engineering or commercial lines, for I believe it is entirely practicable to work out a plan of co-operation with the engineering societies that will eliminate some of the present duplication that seems to exist between them and our Technical Section. Where publicity is involved the only danger of duplication lies in the failure to tell the same story. Repetition cannot hurt if the same objective is in sight.

There is so much room for further development in the electrical industry that a knowledge of the facts cannot fail to make those who study them optimistic as to the future. We feel that the industry is sound, stable and safe; that it offers the world more toward making it better, brighter and more efficient than any other industry can offer.

There is underlying the entire electrical industry a feeling of quiet confidence, a belief in "carrying on," that we believe leads inevitably toward success.

Light and Power Securities Show Stability

Increasing Margin Between Gross Revenue and Expenses Reacts Favorably on the Price of Electric Light and Power Stocks

IN THIS season of reactionary tendencies exhibited by the stock market in general the securities of electric light and power companies have stood out in bold relief. These securities have, on the whole, maintained a much firmer tone than has been exhibited by any other class of securities. One of the principal causes for this stability of electric light and power stocks is the realization by the investing public of the large diversity factor in the industry and the recognition of the basic principle that conditions which operate to curtail one line of business may at the same time stimulate another line.

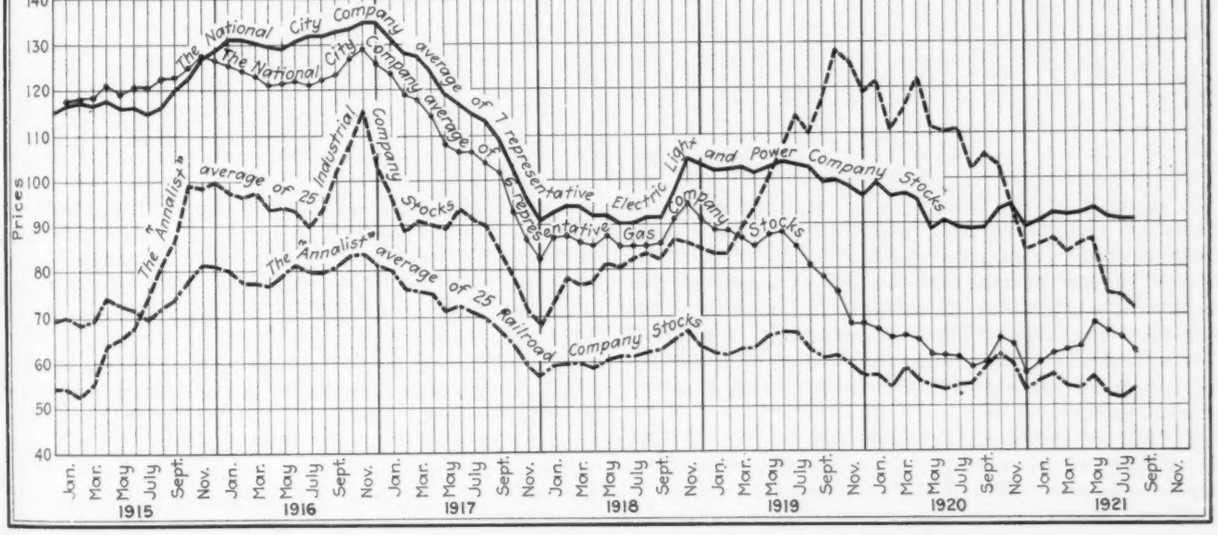
A second very pronounced reason for the comparatively high quotations for electric light and power securities is the fact that the margin between gross revenue received from the sale of energy and the operating and maintenance expenses is showing a material increase. Returns received by the ELECTRICAL WORLD indicate that while the operating expenses of the industry in general are practically the same as reported for last year, the gross revenue has increased by about 10 per cent. Similar relations hold true for every section of the country but are slightly exaggerated in the Atlantic States, where the gross revenue shows an increase of about 15.2 per cent over last year, though the operating expenses increased only 2 per cent over the same period. Such conditions cannot but induce a favorable attitude on the part of the careful investor.

Through the courtesy of the National City Company, the ELECTRICAL WORLD is able to continue its chart (published in the July 23 issue) showing the average prices of the common stock of seven representative electric light and power companies and of six representative gas companies. The curve showing the prices of twenty-five industrial and an equal number of railroad stocks has also been continued through August.

So far as possible the electric light and power stocks represented in the curves are of companies doing a purely electric lighting and power business. With one exception companies combining more than one utility have not been included in the tabulation. In order that the curves may be comparable, the values plotted have been obtained by averaging the high and low sales of each of the stocks which have occurred during each month.

Since the opening of the present year the electric light and power stocks have shown a remarkable stability. The greatest range during this intense reactionary period has been only 2.62 points, and in August the price was only two points above that quoted for January. During July and August the range was less than one-tenth of one point. Against this record of stability exhibited by the electric light and power stocks the variations shown by industrial stocks appear most unfavorably. Industrials showed a range of sixteen points during the first eight months of the year. These stocks have shown a decided drop since May, decreasing from 86 to 71 in August. During the period from October, 1919, to September, 1921, the stocks of twenty-five representative industrials have dropped from 128.5 to 71.5, a range of fifty-seven points. During this same period electric light and power stocks have decreased from 99.5 to 90.9, a drop of 8.6 and an extreme range of about ten points.

Electric light and power companies are beginning to reap the harvest resulting from the inherent stability of the industry and sound methods of financing. The confidence of the public has been obtained in large part, and the public's money is always available to those who hold its confidence. The electric light and power industry in general is returning real money to its stockholders in contradistinction to the suspended dividends now so prevalent among the industrials. Such a condition is bound to continue to react favorably upon electric light and power stocks.



ELECTRIC LIGHT AND POWER STOCKS CONTINUE TO SHOW STABILITY WHILE INDUSTRIALS DROP

Material Decrease in Operating Ratio

Survey of Systems of Electric Light and Power Companies Indicates Extent to Which Efficient Methods and Reduced Costs Have Decreased Cost of Operation and How Utility Dollar Is Increasing in Value to Stockholder

STARTING with January, 1921, the ELECTRICAL WORLD has been collecting monthly statistics on operating and maintenance expenses in addition to its usual monthly statistics on gross revenue and output of the electric light and power industry. These figures are reported for both 1920 and 1921 and show some interesting comparisons as to the trend of the operating ratio* of the industry. the ELECTRICAL WORLD, as indicated in the accompanying tables, leads to some very pertinent conclusions as to the trend of the operating ratio where various types of generating units are employed. During the present year the operating ratio of generating companies operating steam plants only was, on an average, the same during June as during January, namely, about 56.2 per cent. During 1920, however,

TABLE I—AGGREGATE OPERATING RATIO OF COMPANIES REPORTING MONTHLY DATA TO "ELECTRICAL WORLD"

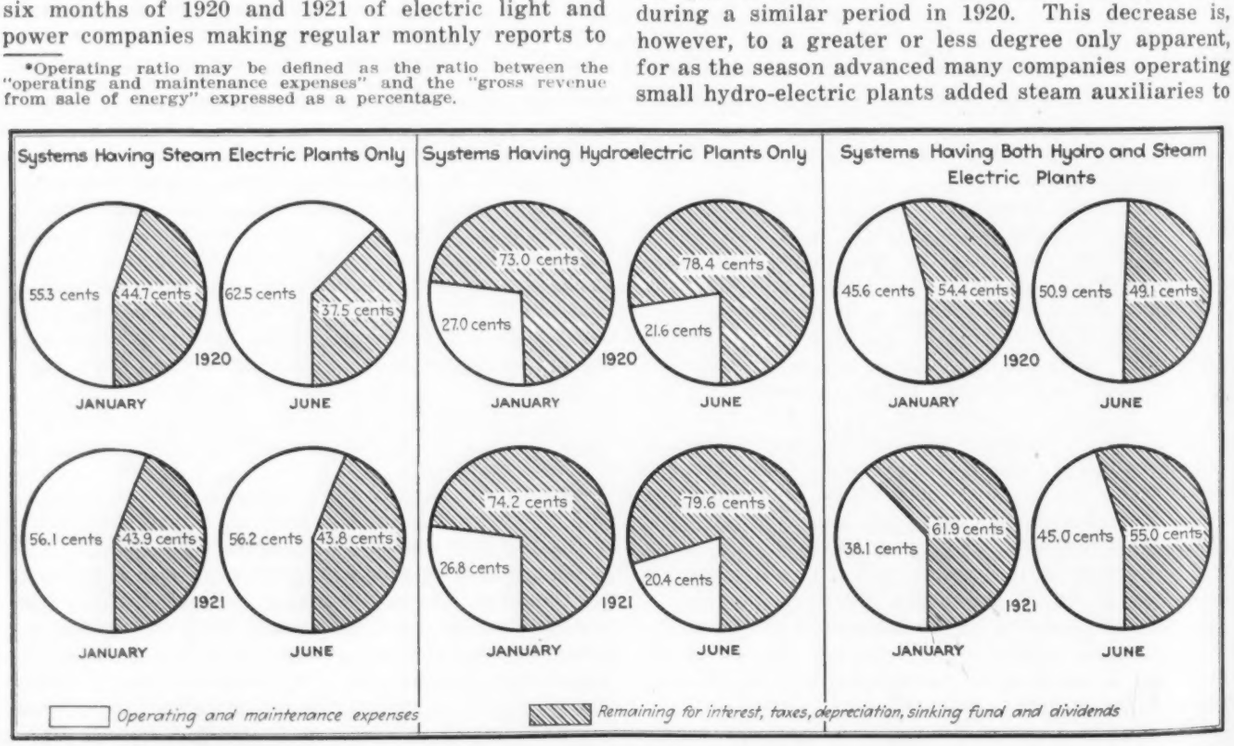
Month	Systems Having Steam Plants Only				Systems Having Hydro Plants Only				Systems Having Both Steam and Hydro Plants			
			Average for Year				Average for Year				Average for Year	
	1921	1920	1921	1920	1921	1920	1921	1920	1921	1920	1921	1920
January	56.1	55.3	56.1	55.3	26.8	27.0	26.8	27.0	38.1	45.6	38.1	45.6
February	55.6	54.5	55.7	54.8	22.9	26.0	24.8	26.3	44.1	47.3	40.1	46.7
March	56.1	57.7	55.9	55.8	23.4	19.6	24.4	24.3	40.2	44.8	40.2	44.2
April	53.0	56.5	55.3	56.0	23.9	19.8	24.3	23.2	41.4	43.3	40.5	45.2
May	55.4	56.8	55.4	56.8	24.2	22.9	24.2	22.9	40.6	44.8	40.6	44.8
June	56.2	62.5	55.4	57.6	20.4	21.6	23.8	22.6	45.0	50.9	41.3	46.1

In order that a definite figure may be obtained, recording companies are requested to report only gross revenue from sale of energy, and under the item of "operating and maintenance expenses" not to include interest, taxes, depreciation or sinking fund. By the comparison of these two items it is believed that a dependable figure is obtained giving the aggregate operating ratio in the manufacture of electrical energy.

A study of the operating ratio figures for the first six months of 1920 and 1921 of electric light and power companies making regular monthly reports to the operating ratio increased from 55.3 per cent in January, to 62.5 per cent in June. These comparisons can be fully explained by the rapid advance in the price of fuel during the spring of 1920 and the stability of fuel prices during the first six months of 1921.

Generating companies operating only hydro-electric plants reported a decrease in the operating ratio during the first six months of 1921 from 26.8 per cent to 20.4 per cent, and from 27.0 per cent to 21.6 per cent during a similar period in 1920. This decrease is, however, to a greater or less degree only apparent, for as the season advanced many companies operating small hydro-electric plants added steam auxiliaries to

*Operating ratio may be defined as the ratio between the "operating and maintenance expenses" and the "gross revenue from sale of energy" expressed as a percentage.



HOW THE ELECTRIC LIGHT AND POWER COMPANY DOLLAR HAS INCREASED IN VALUE TO STOCKHOLDERS

their systems and their reports of operations were, therefore, transferred to "companies having both hydro and steam plants." This transfer left only the companies having the larger hydro plants, the operating ratio of which is, in general, below that of the smaller plants.

The operating ratio of companies having both hydro and steam plants follows more or less the high-water and low-water periods of the rivers of the country. As the amount of water available decreased with the spring and early summer months, these companies were forced to increase their steam-plant operation as the hydro-plant output decreased. The operating ratio gradually increased, therefore, from 38.1 per cent in January to 45.0 per cent in June during the present year and from 45.6 to 50.9 per cent during a similar period in 1920. In comparing June of 1921 with June of 1920, however, a large decrease in the operating ratio is shown. The operating ratio of generating companies operating only steam plants decreased during this period from 62.5 to 56.2 per cent, the companies with only hydro plants decreased from 21.6 to 20.4 per cent, and companies whose systems include both steam and hydro plants decreased from 50.9 to 45.0 per cent.

These figures for the country as a whole are even more significant when the fact is taken into consideration that the gross revenue of the electric light and power companies from the sale of energy during June, 1921, was almost 10 per cent greater than that reported in June, 1920. This increased revenue was realized during the period in which the cost of manufacturing electrical energy was decreasing, and this resulted in revenue above operating expenses greatly in excess of the amount possible had these two quantities increased proportionately.

Table II gives the aggregate operating ratio of electric light and power companies by sections of the country. Operating conditions vary materially in various parts of the country, depending upon proximity of fuel, size of streams and continuity of flow, concentration and density of population calling for a few large plants or many small plants, and distance of transmission. In all three classes of generating systems, however, a downward tendency in the operating ratio is noticeable in every section of the country except in the case of the hydro-electric plants. The expense of operating hydro-electric plants increased in every section of the country during the twelve-month period from June, 1920, to June, 1921, excepting the Atlantic States. This is probably due to increases in wages during that period. The gradual increase reported by systems having both hydro and steam electric generating plants is common to all sections during the first six months of both 1920 and 1921 and is attributed, as indicated above, to the decrease of the operation of hydro-electric plants and the substitution of additional steam plants as part of the system.

That the operating ratio has decreased materially during the past twelve months is certain, and it adds another argument to prove the progress of the electric light and power industry. Many industries through efficient methods and material cuts on every side can report a reduced operating ratio, but few can present figures such as the above, showing a reduced operating ratio and at the same time a high-record gross revenue.

TABLE II—AGGREGATE OPERATING RATIO OF ELECTRIC LIGHT AND POWER COMPANIES BY SECTIONS

Type of Generating Plant and Month	New England States		Average for Year		Atlantic States		Average for Year		North Central States		Average for Year		South Central States		Average for Year		Mountain and Pacific States		Average for Year	
	1921	1920	1921	1920	1921	1920	1921	1920	1921	1920	1921	1920	1921	1920	1921	1920	1921	1920	1921	1920
Steam Plants:																				
January	54.0	60.8	54.0	60.8	53.5	50.9	53.5	50.9	61.2	61.8	61.2	61.8	53.1	53.7	53.1	53.7	69.0	60 5	69.0	60.5
February	54.3	59.5	54.2	60.3	52.3	53.0	52.7	52.1	63.0	57.9	62.1	59.8	59.1	51.2	56.2	52.3	60.2	60.3	64.3	60.3
March	64.0	70.0	56.7	62.5	54.5	56.7	53.3	53.7	58.4	59.7	60.8	59.8	53.3	50 9	55.0	51.9	68.4	62.5	65.9	61.2
April	59.4	63.5	57.3	62.7	50.9	54.3	52.8	53.8	54.8	61.2	59.3	60.2	54.1	52.8	54.7	52.1	53.7	53.7	61.8	58.6
May	63.2	69.1	58.3	63.8	56.2	58.6	53.4	54.5	54.7	63.3	58.5	60.8	53.3	56.0	54.4	53.0	55.0	57 0	59 9	58.3
June	60.1	71.2	58.7	64.9	55.8	59.5	53.8	55.3	56.6	68.3	58.3	61.8	55.3	60.0	54.6	53.8	53.4	56.2	58.6	57.8
Hydro Plants:																				
January	26.5	35.2	26.5	35.2	21.2	21.2	21.2	21.2	25.0	20.8	25.0	20.8	26.4	20.1	26.4	20.1	27.5	27.3	27.5	27.3
February	30.1	46.5	26.8	35.6	20.1	20.6	20.7	20.9	24.1	20.6	24.6	20.6	28.6	21.4	27.4	20.5	23.9	27 9	26.0	27.6
March	29.9	30.0	26.9	35.3	21.0	20.6	20.8	20.8	23.0	20.6	23.5	20.6	30.4	23.2	28.4	21.3	24.9	19 0	25.8	25.6
April	24.6	34.7	26.5	35.2	18.2	18.8	20.2	20.3	24.8	20.8	24.2	20.7	22.4	25.0	26.8	21.2	27.3	19.2	26 0	24.2
May	26.5	25.6	26.5	34.3	15.5	17.4	19.2	19.7	21.5	20.1	22.5	20.5	27.9	21.2	27.1	21.2	29.8	22.9	26.6	24.0
June	29.2	21.5	26.6	33.8	17.6	18.8	19.0	19.6	21.1	19.5	22.8	20.2	27.3	18.3	27.1	20.7	30.3	27.4	27.6	24.2
Combined Systems of Steam and Hydro Plants:																				
January	45.3	53.5	45.3	53.5	43.5	45.8	43.5	45.8	39.5	38.6	39.5	38.6	38.6	46.6	38.6	46.6	35.2	45.6	35 2	45.5
February	44.3	60.0	44.7	58.8	41.8	41.9	42.6	43.8	42.4	49.8	41.9	48.2	41.7	39.6	40.5	42.0	39.6	43 8	37.4	44.7
March	49.7	53.8	47.3	56.0	39.7	47.3	42.0	45.3	41.5	46.0	41.8	47.3	38.6	39.2	40.2	41.2	36.4	39.7	36.9	43.0
April	46.6	48.5	47.1	53.5	42.9	43.9	41.9	44.8	45.0	48.3	42.7	47.5	43.6	48.6	40.7	42.8	37.0	36.8	37.0	41.0
May	49.2	48.5	47.6	52.3	39.8	44.2	41.4	44.7	47.0	52.8	43.7	48.8	40.7	39.6	40.6	42.2	35.0	38.3	36.4	40.3
June	58.5	56.5	49.6	53.2	42.3	45.8	41.6	44.9	50.1	62.2	45.0	51.6	45.1	44.8	41.3	42.7	38.8	44.3	37.0	41.1

Electric Steel Production in 1920 Totaled 747,724 Gross Tons

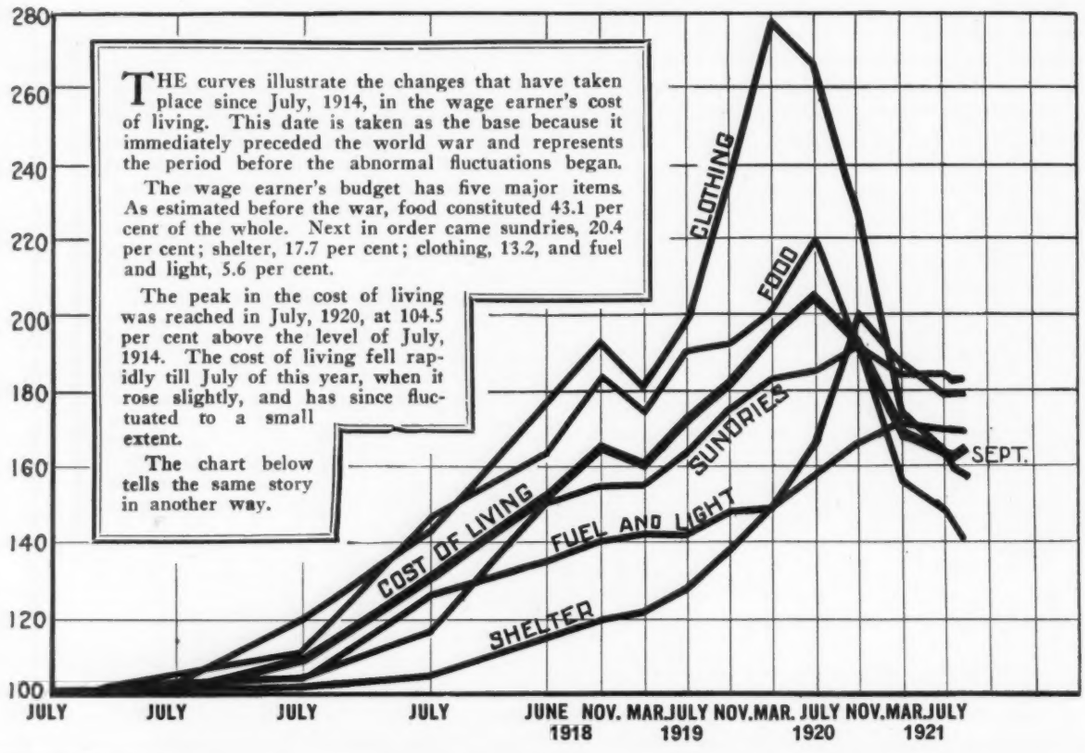
RECENT figures issued by the American Iron and Steel Institute indicate that the production of steel in the United States in 1920 reached a total of 43,793,226 gross tons. This is an increase of 21 per cent over 1919, but was 5.3 per cent below the output during the war rush of 1918. Electric steel output in 1920 totaled 747,724 gross tons, which was an increase over the 1919 production of 32 per cent. Electric steel ingots and castings totaled 502,152 gross tons in 1920 and electric steel alloys totaled 245,572 gross tons. Following is the 1919 and 1920 production:

	Gross Tons	
	1919	1920
Open-hearth	26,948,694	32,671,895
Bessemer	7,271,562	8,883,087
Crucible-steel ingots and castings	63,572	72,265
Electric steel ingots and castings	384,452	502,152
Miscellaneous ingots and castings	2,952	5,535
Open-hearth alloy steels		
Bessemer alloy steels	1,299,556	1,414,720
Crucible alloy steels		
Electric alloy steels	181,632	245,572
Total production	36,152,420	43,793,226

The total production of electric ingots in 1919 was 448,517 tons, and in 1920 it was 580,818 tons. The total production of electric castings in 1919 was 117,567 tons, and in 1920 it was 166,906 tons.

INDEX NUMBERS OF THE COST OF LIVING IN THE UNITED STATES

100 = AVERAGE PRICES IN JULY, 1914



THE curves illustrate the changes that have taken place since July, 1914, in the wage earner's cost of living. This date is taken as the base because it immediately preceded the world war and represents the period before the abnormal fluctuations began.

The wage earner's budget has five major items. As estimated before the war, food constituted 43.1 per cent of the whole. Next in order came sundries, 20.4 per cent; shelter, 17.7 per cent; clothing, 13.2, and fuel and light, 5.6 per cent.

The peak in the cost of living was reached in July, 1920, at 104.5 per cent above the level of July, 1914. The cost of living fell rapidly till July of this year, when it rose slightly, and has since fluctuated to a small extent.

The chart below tells the same story in another way.

PURCHASING VALUE OF THE DOLLAR

BASED ON RETAIL PRICES WEIGHTED ACCORDING TO IMPORTANCE IN AVERAGE FAMILY BUDGET

(NATIONAL INDUSTRIAL CONFERENCE BOARD)

The Plain Facts About the Business Outlook for Electrical Men

A Review of the Economic Influences Now Encouraging the Revival of Business, with Supporting Facts from Recent Experience in the Electrical Industry

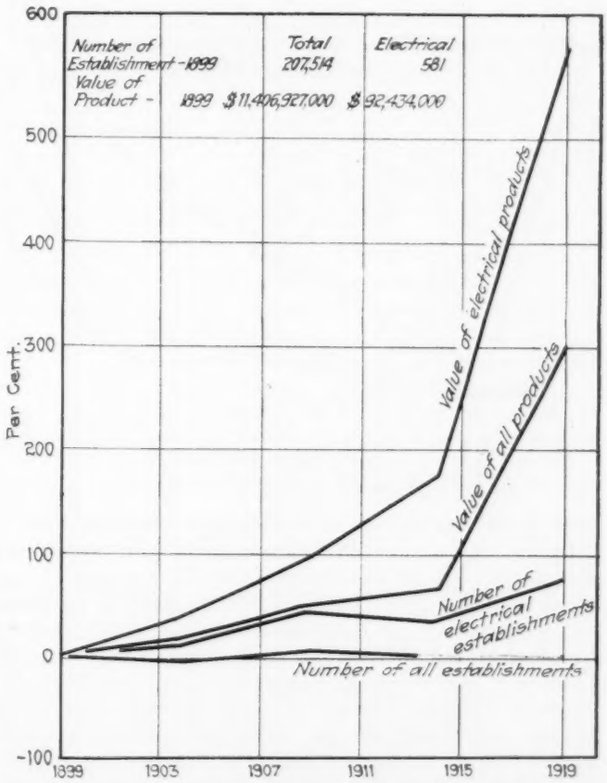
By EARLE E. WHITEHORNE

GENERAL economic conditions continue to be the all-engrossing topic of discussion. But there is a new note growing stronger in it all. When two men meet each other on the corner today, after the greeting, one says: "Well, what do you think about business?" The answer comes: "Things seem to be looking up. I guess we've turned the corner all right." And the first man responds: "That's what everybody is saying. I guess it's so." In other words, what Thomas A. Edison has called the "fear load" is gradually lifting.

Confidence and optimism, or anxiety and mental depression, are ever a very large factor in the business situation of extremely good or unusually bad times. In a recent interview Mr. Edison expressed it graphically: "What we have been going through," he said, "is nothing but a period of depression, and nothing to worry over, provided we set ourselves resolutely to the task of overcoming it. These periods of depression come in recurring cycles. They are nothing new. The point to be driven home is that the country always recovers from them and goes forward with greater strides than ever before. We will get over this one, too. The tide already has begun to turn. Times are getting better now, slowly, of course, but surely. These periods of depression are caused by a faulty adjustment of our economic machine, or by it being thrown out of gear by some unusual force such as war. The machine is all right; it will work properly when the obstruction moves."

But better times cannot be built on theory alone, and it must be understood that it is on facts and figures of distinct improvement that the present swelling wave of economic restoration is feeding. In the ELECTRICAL WORLD of Sept. 10 statistics were given showing that while production among electrical manufacturers had declined from 73 to 52 per cent of capacity during the first half of this year, the situation was already beginning to stiffen on increase of orders and to show an actual upward trend. Moreover, these figures were, after all, calculated on the basis of war capacity, which is probably double that of the years preceding the war. We may have shown on July 1, 1921, operations of but 52 per cent of plant capacity, but comparisons with pre-war output would indicate a percentage far closer to our normal peace-time records, despite the fact that export business has been dissipated to such a degree. This must be reckoned in, for every calculation must embrace and estimate the influence of contributing conditions as well as mere reports of growing trade.

The business of the electrical man cannot be isolated from other business. The market for electrical products and the prosperity of the electrical industry are indissolubly compounded with the business of other men and the prosperity of other industries. The economic problems of the nation—which today have come to be the problems of the world—are the concern of every electrical manufacturer and jobber, every central-station-company executive, every contractor and dealer, because they directly influence his business. And so it becomes imperative with him that such affecting issues be widely guided and developed. What are these broad, economic conditions by which the business revival is being shaped? It is well for every man to have them classified in his mind so he shall be conscious of them and recognize and take advantage of their trend.

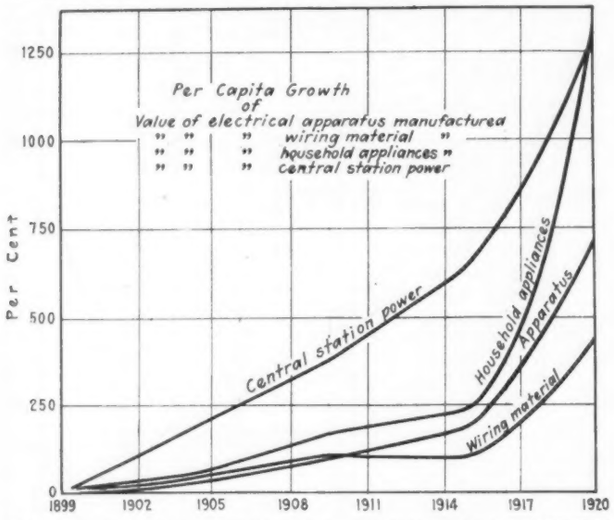


VALUE OF PER CAPITA GROWTH OF ELECTRICAL MANUFACTURED PRODUCTS COMPARED WITH ALL MANUFACTURED PRODUCTS

The Tax Situation.—The mind of the country is much engaged with the tax burden. People are tired of taxes that are hard to pay, so Congress is convened in extra session to frame a bill to provide some adequate measure of relief. Business men in general have come to a point where they despair of receiving immediate aid and are resolved to go ahead and do business in spite of it; but there is a widespread feeling that some relief must come before long, and this confidence is being expressed by more constructive activity. The yield of the tax is falling below the estimate, and a reduction in

the rate can be expected to increase the revenue by stimulating business; therefore men believe that a reduction in income surtaxes and excess-profits taxes will surely come.

The Budget Situation.—The prospect of saving $350,000,000 in the expenses of the government through the institution of the budget system is bringing great encouragement not only to business but to the consuming public. The nation has confidence in Charles G. Dawes, Director-General of the Budget, and looks to



INCREASE IN VALUE OF ELECTRICAL APPLIANCES MANUFACTURED AND CENTRAL STATION POWER AS COMPARED WITH INCREASE IN WIRING MATERIAL AND HOUSEHOLD APPLIANCES

him to put an end to the inordinate waste of money through duplication and inefficiency in government departments. Every one believes that such a vast saving must bring relief and have a good influence on business.

The Disarmament Situation.—The knowledge that 92 per cent of the revenues of our government go to pay the cost of past wars and preparation for possible future conflicts has been borne in on the consciousness of the people. Secretary of the Treasury Mellon has estimated federal expenditures for the year ending June 3, 1922, at $4,600,000,000. If the President, the Cabinet, Congress and all departments, including the mails and other services at home and abroad, were discontinued, it could effect an economy of but $400,000,000. The balance of $4,200,000,000, Mr. Mellon says, "represents burdens directly traceable to war" either past or prospective. Such a condition is unbelievable and not to be suffered, and the calling of the conference on the limitation of armaments has put hope in men's hearts that some help may be in sight. This conference will not disarm the world, but it does crystallize the demand of peoples and it is encouraging.

The Employment Situation.—It had been reported that there were 5,735,000 unemployed workers in the United States idle as a result of business depression. It appears now that the probable non-employment does not actually total much more than 3,750,000, or about two and a half times the 1,500,000 who are unemployed in this vast country in normal times. It is a bad condition in spite of that, but a national conference on unemployment has been at work in Washington, not theorizing on our social system, but endeavoring to find "a practical remedy for unemployment through employment," as Mr. Hoover expresses it. And the knowledge of this fact is stiffening the back of business.

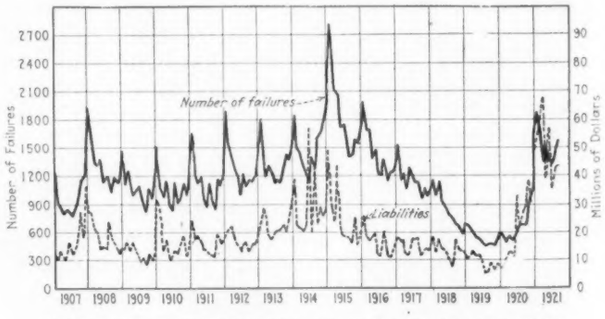
The Railroad Situation.—The problem of the railroads has not yet been solved, but the business of the railroads has been steadily improving. Freight-car loadings have been gradually increasing in the last six months. More money is being made. It is believed that the long-desired settlement with the government will be effected before very long, releasing funds for postponed construction and improvements and turning loose a flood of money into the channels of trade. Plans for a more efficient operation of the railways in group systems are being worked out, and there is a general feeling that the railroads are getting back on their feet.

The Crop Situation.—The rise in the price of cotton has brought renewed life and activity to the South. Higher prices for grain crops have made better feeling in the other rural sections. Farmers are marketing crops as they are harvesting, and spending money. General crop conditions are distinctly encouraging.

The Price Situation.—Prices have been gradually working down. Commodities in which the labor element is large are lagging because labor is naturally slow in its reaction. But it must and will give way before the general adjustment and every one realizes that conditions are improving. Prices are coming down.

The Foreign Trade Situation.—There is little progress to be seen in export trade. The European nations are apparently working out a measure of salvation and bettering their own conditions. Without a system of long time credits, however, there seems to be small opportunity for the development of export business from the United States, under present unbalanced rates of foreign exchange and the existing tariff. And no way is found to provide the credits. But business is making up its mind to go ahead without the export market until something turns up to make trade possible with foreign countries. The matter presses for settlement, but the general attitude is that domestic business must now be developed anyway. The influences of the export tangle are being discounted.

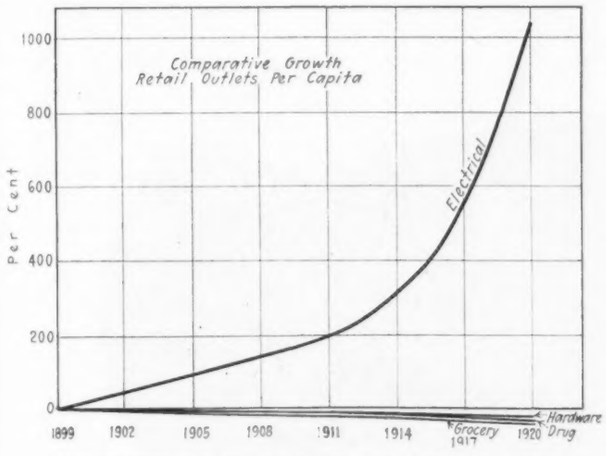
All these conditions listed here in briefest comment are factors in the market situation of every American business man—elements which will affect the plans of every member of the electrical industry. It is the



GRAPHICAL PRESENTATION IN DECLINE OF FAILURES AS TRADE IMPROVES

expectation and consideration of these improving situations that are making men steadily more certain that conditions are improving and that the time has come to go ahead. And what is the result? Because business is stronger, the extreme financial restrictions have been materially eased, and in spite of the record-breaking drop in commodity prices, with consequent shrinkage in inventory values, the rate of business mortality is falling off. There have been fewer failures. The curve is working down again after the financial storm

of last fall and winter. It is reacting to the fact that there is more general buying. People are beginning to spend money less fearfully. In the department stores of New York, for instance, there were 18.2 per cent more individual sales in August than for the same month last year, and this is general throughout the country. Chain-store systems report an increase and mail-order houses also show an advance. The reports of the Federal Reserve Bank, from the different districts, show a distinct general business improvement and a



COMPARATIVE GROWTH OF RETAIL OUTLETS PER CAPITA

melting of the gloom. Inquiries and orders are both becoming more numerous. Buying is better and selling is better and so business is better. And buying is particularly better in the electrical industry.

There are two reasons why business is improving in the electrical industry, and one of them is largely the source of the other. In the first place, the light and power company is slowly and steadily gaining in popularity with the people, both as a public service and as an investment. Hundreds of thousands of dollars of central station securities have been marketed in the last few years direct to the local public. These security sales have been accomplished by active campaigns of information that have spread more light about utilities than ever has been seen before. Heaven knows that there remain enough companies that still have not made friendly peace with their customers and gained their understanding and appreciation and are not yet profiting by the benefits that popular sympathy will ever bring. But much progress has been made. To sell securities the people have been given the facts and the facts have spoken. And a better market has come for electrical appliances and the product of the generators.

All this has naturally reacted on the sale of electrical merchandise, and appliances are being sold this year in a volume far larger than many men appreciate. Many manufacturers report better appliance sales than last year. One of the largest producers has sold 50 per cent more heating appliances so far this year than in the like period in 1918 and 30 per cent more than in 1919. Others show similar gains, although the large stocks carried over from last year by jobbers and dealers affect some figures adversely. But the people are buying electrical devices because more and more they are becoming convinced of the comfort, the convenience and the practical economy they offer. Therefore the local sales are growing. Business may have been bad this year, but still the totals on appliance sales by central-station companies and contractor-dealers throughout the country swell to an impressive figure. A few examples taken at random may be cited:

Twenty-five central-station companies in Pennsylvania, not including any of the large cities, sold in the first seven months of this year 3,000 flatirons, 500 washers, 1,300 cleaners and small appliances to make a total of 6,200.

Twenty central-station companies in Texas, not including any large city, sold in the same period 1,200 flatirons, 230 washers, 700 cleaners and small appliances to make a total of 10,000.

Ten central-station companies in Kansas, including no large city, sold in the same period 810 flatirons, 450 washers, 415 cleaners and small devices to make a total of 2,850.

Twenty central-station companies in Utah, including one large city, sold in this same time 3,100 flatirons, 1,550 washers, 1,000 cleaners and enough other appliances to total 6,500.

Two central-station companies in Rhode Island, in small cities, have sold in eight months this year 1,485 flatirons, 200 washers, 435 cleaners and other devices to total 2,725.

A central-station company in a small city of Massachusetts has sold through August 2,690 flatirons, 63 washers, 487 cleaners and devices to total 4,777.

A central-station company in Maine has sold through August 2,534 flatirons, 209 washers, 413 cleaners and other appliances to aggregate 3,502.

One of the large Middle West utilities reports that range sales for the first six months this year were 20 per cent greater than for the entire year of 1920 and that range connections will be 30 per cent more.

Appliance sales by electrical contractor-dealers are aggregating a tremendous volume.

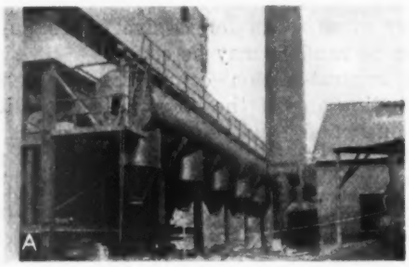
PROOF IN THE TREND OF GROWTH

In short, the electrical business, despite the closing era of bad times, has still been moving in large volume and with irresistible growth, because the idea of using electrical appliances is just beginning to be brought home to the great buying public. The recent survey in Philadelphia showed that in about 1,300 small houses there, where there is an average of but two appliances per house, the appliance load already has built a greater consumption of energy than the lighting load and on a summer test. What will the conditions be five years from now?

As a result of this increasing public interest in electrical appliances some interesting developments have been taking place, as shown graphically on these pages. Whereas the number of clothing stores, hardware stores and grocery stores has slightly fallen off in recent years, the number of electric shops has increased greatly. The percentage increase in value per capita of all the products of electrical manufacturers as compared with other manufacturers has shown enormous acceleration for the electrical industry. The comparative curves of the different electrical products show a tremendous swelling of the demand for appliances over and beyond a normal growth for other electrical materials and apparatus. It is not hard to picture how great a stimulus will come before very long when stabilized conditions begin to influence the more rapid building of homes and the demand sets in for electrical material.

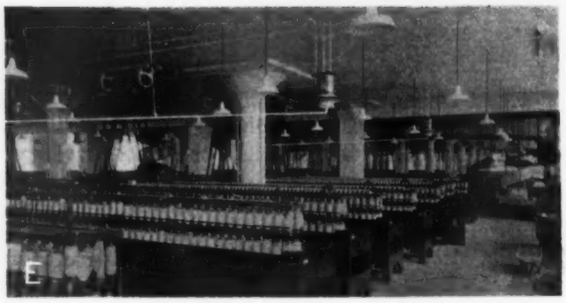
In short, business is better. The electrical man is selling more. Substantial business is ahead and the "fear load" can be laid aside.

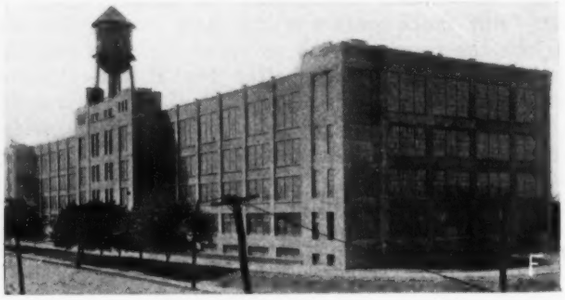
Some Industrial Installations of Recent Months



While industrial construction is below that of 1920 statistics show it has not stopped at any time

Rehabilitation, adaptation and new building will speed up as conditions continue to improve





A — Mississippi Glass Company, Floreffe, Pa. An extension involving $100,000 worth of mechanical and electrical equipment.

B — Corning (N. Y.) Glass Company, new boiler plant with $200,000 of mechanical equipment.

C — Great Falls Manufacturing Company, Somersworth, N. H. New building with 850 looms and 55,000 spindles built by Lockwood, Greene & Company.

D — Mutual Enamel Ware Company, Chattanooga, Tenn. About $100,000 in mechanical and electrical equipment.

E — Spinning room of Great Falls mill shown at C.

F — Westinghouse Lamp Company's plant at Indianapolis, Ind. Dwight P. Robinson & Company, Inc., installed mechanical and electrical equipment in all the factories shown except those of C and E.

Lower Prices Will Bring Better Business

Although It Is Apparent the Tide Has Turned, Improvement Will Be Gradual, Making Itself Strongly Felt Next Spring, with Full Recovery Well Advanced by 1923

By SHIRAS MORRIS
President Hart & Hegeman Manufacturing Company and Johns-Pratt Company, Hartford, Conn.

SHIRAS MORRIS

WITHIN the past six or eight weeks the sentiment of the electrical market has undergone a complete change for the better. Ever since last fall incoming business had been diminishing and buyers quite naturally had withheld orders. We had for some ten months or more been undergoing a reaction from the unbridled sellers' market of late 1919 and early 1920. The pendulum had swung upward to an alarming degree and there was no artificial force great enough to sustain it. Therefore it began to swing the other way.

Now it looks as though the reaction had gone almost too far for the present. This does not mean, however, that we are speedily on our way to another boom period. There will be no quick recovery of business. It will come as it is coming now, slowly and gradually. By next spring we should see the market well on its way to recovery. Before that time, however, there must be a further purging of business in the fire of lower costs.

Business and labor are becoming tired of inactivity, but neither can make any real progress forward—and they both know it—while shackled with the chains of high costs.

It is not a case of raw-material prices—these have hit pretty near low. Copper and cotton are probably as low as we shall see them for a good many years. In fact, both of these items are due for a substantial rise as soon as a buying market sets in. Some materials, like iron and steel and coal, depend on two items—labor and freight. The labor situation will probably be decided by next spring. The demand for lower freight rates is becoming more insistent each day, and while the railroads naturally are doing all they can to postpone any such action, it is impossible to see how they can hold out much longer.

In looking for better business, however, it must be remembered that the year 1920 was an unusual year, built up to a large degree on fictitious business. A buyer was apt to place his order in from two to six places in the hope of getting some kind of a delivery. When a slump seemed imminent cancellations were resorted to. The business was unsound and for that reason must be cast out of the business thinking of the electrical as well as every other industry.

Some manufacturers, it is true, misread the conditions and took the 1920 business mirage to be the real thing. On the strength of these beliefs they went ahead expanding. To them, of course, this period of depression has been unusually painful.

Still, the bottom has not dropped out of the market. The market has merely changed in character. From 1915, except perhaps for the early months of 1919, business went through a sellers' market. It was so tremendous that it ran away with itself. We forgot our awe of millions and became very familiar with the word billions. It all seemed so easy. Everybody got the spirit. Labor got it and worked less and asked for more. Salesmen no longer really worked. They took orders or explained why orders booked for some months hadn't been delivered. Factories didn't look for business, instead they turned it away.

In the five years of the biggest sellers' market in the history of the world the art of salesmanship was almost lost. Since then manufacturers and jobbers have been sitting back in their chairs feeling very blue and doing a lot of self-pitying. All they saw was a decreasing volume of bookings, and their answer almost invariably was to cut expenses. And it is good that they did. They are now on a better foundation to do business. Those who are left in the office or the shop realize that a full day's work is expected.

This method, however, of keeping gross income and expenses away from each other has a limit, and it is now time to work on the other end—increase the gross. We are in a buyers' market now and we must therefore seek the buyer. For five years we had a grand vacation from selling and it left us soft.

There are some electrical manufacturers who are doing a nice business today. These manufacturers recognized the changed conditions and quickly adapted themselves to them. They are selling their goods at prices based on present costs of labor and material regardless of the loss they may have to take on the inventory which is being used.

The buying public feels that the prices of such manufactures are as low as they probably will be in the immediate future and buys without restraint. The other kind of manufacturer, whose prices are not adapted to the present values of labor and material but who is attempting to sell on the basis the material cost him months ago, is retarding the revival of his business.

When a salesman is obliged to say frankly that prices on his line will probably be lower in the near future, he has not given a very good argument for receiving orders, and the buyer naturally buys nothing except his immediate urgent requirements. When the entire industry is back to normal and reasonable costs and selling prices, I look for a vigorous revival in business. The electrical material is not a very large percentage of building costs, but it is a factor, and lower building costs will unquestionably stimulate the whole general business situation.

Just now the South is in clover with high cotton prices. The crops of the Middle West have put the farmer in a better frame of mind. The water-power development of the West Coast means almost unthinkable electrical business of every description. The central station companies have now available capacity. They are not standing back calmly waiting for business. They are wiring old houses, extending lines and filling them with new business, pushing street lighting and generally getting back to the pre-war days when the central-station company was looked on by every one as the great developer and builder of the electrical business.

To sum up, business is not bad. It is getting better and by spring should be in very fair condition. It will not come up to the bloated 1920 period of pyramided orders. By 1923 we should have pretty well recovered our market equilibrium.

Jobbers See Steady Improvement Ahead

Although the Volume of Business Is About 50 per Cent What It Was Last Year, Stocks Are Lower and Wholesalers Are Entering the Winter with Optimistic Spirit and Feeling that Spring Business Will Be Good

STEADY improvement, slow but continued, with full activity coming somewhere between spring and fall next year, is the optimistic outlook on the electric supply jobbing situation. The long pull is here so far as the jobbers are concerned. Such is the sentiment revealed by a survey made by the ELECTRICAL WORLD, the conclusion being based on letters from more than eighty jobbers, representing every section of the country.

A questionnaire was sent to all electrical jobbers asking six questions, as follows:

1. How does your volume of sales compare with that (a) at the beginning of this year and (b) a year ago?
2. Were your stocks on Sept. 1 very low, moderate or large?
3. What is your present rate of turnover and how does this compare with the last quarter of 1920?
4. In what condition do you intend to maintain your stock for the remainder of the year?
5. Has the bottom been reached in your locality, and if so when? And if not, when, in your opinion, will it be?
6. What is your personal opinion of the outlook in the electrical industry locally?

The answers have been tabulated and will be found on the next page.

Sales volume is lower than it was last year by almost 50 per cent on the whole. Here and there a jobbing house is found that is doing a better business than it did a year ago. With the first of the year, however, the comparison is more favorable. Almost as many houses are handling a greater volume as are handling less. The strength, however, seems to lie for the most part in the Middle West.

In looking at these results on sales volume, however, it must be remembered that prices have materially declined in the past twelve months. Even with the same tonnage handled sales volume would be less on a dollars-and-cents basis. Not a few jobbers took pains to point this out and say that their sales tonnage shows a healthy increase while gross revenue continues to decline.

Stocks show a much healthier condition than they did last year, and the natural result has been to strengthen greatly the credit position of the jobbers. Last year almost every jobber was overstocked. He had to be if he were going to perform his logical function. Now only here and there is a large stock found. For the most part stocks are moderate and not a few have been consistently reduced until they are now quite low. There are, of course, a number of overstocks on miscellaneous items, but not enough to be at all a serious factor.

Moreover, the jobbers are going to maintain their practice of reducing stocks until they feel that prices have reached a reasonably steady basis. There is, however, a well-defined feeling that stocks should not be reduced beyond the point where service would suffer. Some of the jobbers are going to do a certain amount of stocking this fall, but principally in such items as wire, loom and pipe, which they feel have about run their course in price reduction.

TURNOVER SLOWER THAN A YEAR AGO

The general impression one gets in going over the replies to the question of turnover is that it is slower now than it was a year ago, in spite of lower stocks. The replies, however, were not satisfactory on the whole and showed a rather uncertain knowledge on the part of some as to their present turnover.

Has the bottom been reached? This seems to be the question of the hour. For the electrical jobbers the answer is yes. There are still quite a few doubters but on the whole jobbers feel that the corner has been turned. Where answers are given the time is placed as the months of July and August.

There are some who feel that it will be spring before the downward trend of business ceases. These con-

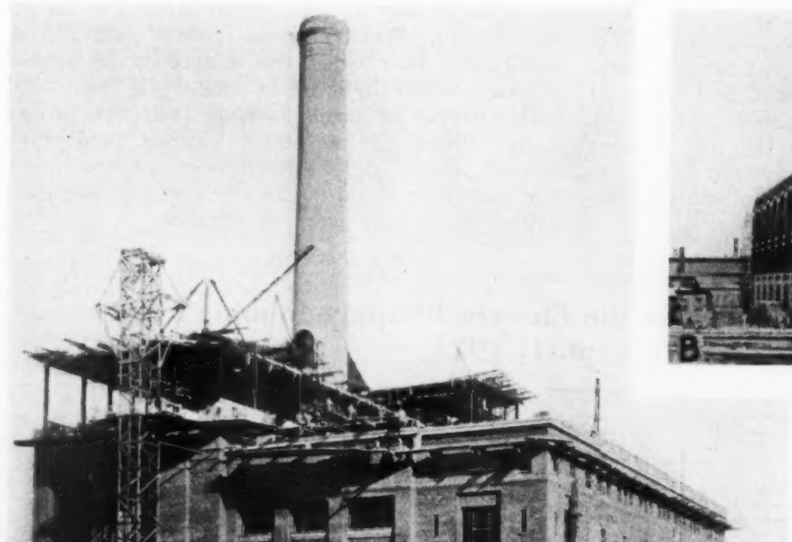
cerns, however, are in regions dominated by a single industry. This industry must pick up before these jobbers can begin to enjoy improved business.

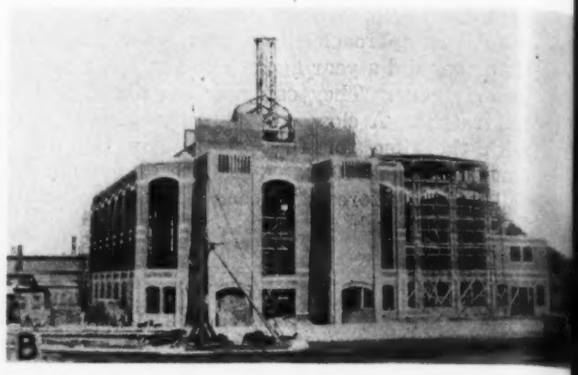
Jobbers approach the winter much more cheerfully than they did a year ago. The sun has risen and darkness is gone. They can now see ahead and the road is straight. A slow, gradual improvement is expected, with the time for full activity varying put between spring and fall 1922. A few, while looking for better fall business, foresee a reaction after the holidays lasting until March or April.

All predictions, however, are bound up with local conditions. Montana jobbers, for instance, are hopeful but state frankly that the copper demand is the governing feature. West Virginia jobbers can't see beyond April next year when the miners' wage agreements expire. Better building is looked for next spring—better buying by farmers—more industrial production. Lower prices are earnestly awaited, and one very shrewd jobber of the South even went so far as to say that there would not be any real improvement until prices began once more to advance.

Summary of Conditions in the Electrical Supply Jobbing Field as of Sept. 1, 1921

No. of Replies by Sections	Volume of Sales Compared with		Condition of Stocks on Sept. 1	Rate of Turnover		Stocks for Rest of the Year	Has Bottom Been Reached Yet?	Outlook
	Beginning of Year	Year Ago		Now	Year Ago			
New England — nine replies	1—50% less 1—17% less 1—10% less 1—smaller 1—same	2—50% less 2—40% less 1—33⅓% less 1—30% less 1-10 12%less 1—same	6—moderate 2—'ow 1—large	1—half last yr. 1— times 1—5⅓ times 1—5 times 1—6 t 7 mos. 1—7 times	2—same 1—8 times 1—3 mos.	1—moderate 5—low	6—yes 2—no 1—don't know	3—slow but gradual improvement 2—fair 2—good 1—fair for two months, then slow until late spring. No good business for a year 1—improvement but will be a year before back to normal
Middle Atlantic—twenty-five replies	1—20% more 1—15% more 1—improved 2—same 1—10% less 1—11% less 1—13% less 1—17% less 1—33% less 1—40% less 1—53% less	3—increase 2—10% less 1—17% less 1—20% less 2—22% less 1—25% less 3—30% less 3—40% less 1—43% less 1—47% less 3—50% less 1—57⅛% less 1—less	10—moderate 11—low 2—large	1—6½ times 2—6 times 1—67 days 6—4 times 1—3.4 times 2—3 times 1—2 times	1—8 times 1—34½ days 1—6.6 times 2—6 times 1—5 times 3—4 times 1—unchanged 3—slower than now 5—faster than now 1—20% greater than now 1—Twice as great as now	10—moderate 12—low 1—45 days 1—90 days	10—yes 6—no 2—partially 3—don't know	6—good 5—slow improvement 6—improvement to come in the spring 2—fair 3—improvement depending on local labor situation 1—bad
South Atlantic—five replies	1—11⅓% less 1—40% less 1—50% less	2—30% less 1—40% less 1—46⅓% less 1—60% less	3—moderate 2—low	1—same as last year 1—3 times 1—3½ times 1—2½ mos.	2—6 times 1—4 times	5—low	2—yes 2—no	4—gradual improvement with good spring demand 1—improvement with spring depression
East north central—fifteen replies	1—44% more 1—20% more 1—same 1—large 2—10% less 1—26% less 1—30% less 1—33% less	1—28% less 1—33⅓% less 2—35% less 3—40% less 1—50% less 1—56% less 2—60% less 1—62% less 1—67% less 1—smaller	9—moderate 5—low 1—large	2—10 times 2— 6 times 2— 4 times 2— 3 times 1—moderate 1—slow 1—75% of a year ago	2—12 times 1—10 times 3— 6 times 1— 4 times 3—higher than now	3—moderate 10—low 1—on 1917 basis	6—yes 8—no 1—don't know	5—slow, gradual improvement 4—poor 3—better in spring 1—favorable 1—fair 1—no change
East south central—five replies	1-25% more 1—16⅓% more 1—same	1—25% less 1—20% less 2—50% less	4—moderate 1—low	1—12 times 1—4 times 1—15% under normal	1—12 times 1—8 times 1—6 times 1—25% under normal	1—moderate 3—low	4—yes 1—don't know	3—steady increase 1—improvement shortly 1—fair to good
West north central—thirteen replies	1—12% more 1—better 2—same 1—fair 1—14% less 1—20% less	1—same 1—25% less 1—30% less 2—40% less 1—42% less 1—40-50% less 3—50% less 1—53% less 1—less 1—poor	6—moderate 4—low 3—large	1—10 times 1— 6 times 2— 5 times 1—4½ times 3— 4 times 1—2½ times 1—1½ to 2 times	1—10 times 1— 8 times 1— 6 times 1— 5 times 1—4.8 times 1— 4 times 1—1-1½ times 1—same as now 1—more than now	3—moderate 9—low 1—larger	10—yes 3—no	3—fair 4—slow increase 2—poor 1—good now—dull first quarter 1—good in 10 months 2—good business ahead
West south central—three replies	2—same	1—25% less 2—40% less	1—moderate 1—low 1—normal	1—7 times 1—2½ to 3 times	2—4 times	1—normal 1—low 1—60 to 90 days	2—yes 1—no	1—increase but unprofitable 1—good 1—no marked improvement until spring
Mountain—six replies	1—10 to 15% more 1—20% less 1—32% less	1—27% less 1—35 to 40% less 1—43% less 1—45% less 1—50% less	3—moderate 2—large 1—low	1—4 times 1—3 times 1—2½ times 1—2 times 1—60-90 days 1—5 months	1—6 times 2—4 times 1—3 times 1—60 to 90 days	2—moderate 2—low 1—60-90 days 1—50% less	6—yes	3—quiet 1—good 1—very poor 1—better to Jan. 1, then quiet
Pacific coast—three replies	1—10% less	1—better 1—40% less 1—50% less	2—moderate 1—large	1—7 times 1—3 times 1—133 days	1—5 times 1—3½ times 1—favora' le with now	1—moderate 1—low 1—20% lower	2—yes 1—no	1—good 1—better to Jan. 1, then a lull 1—better

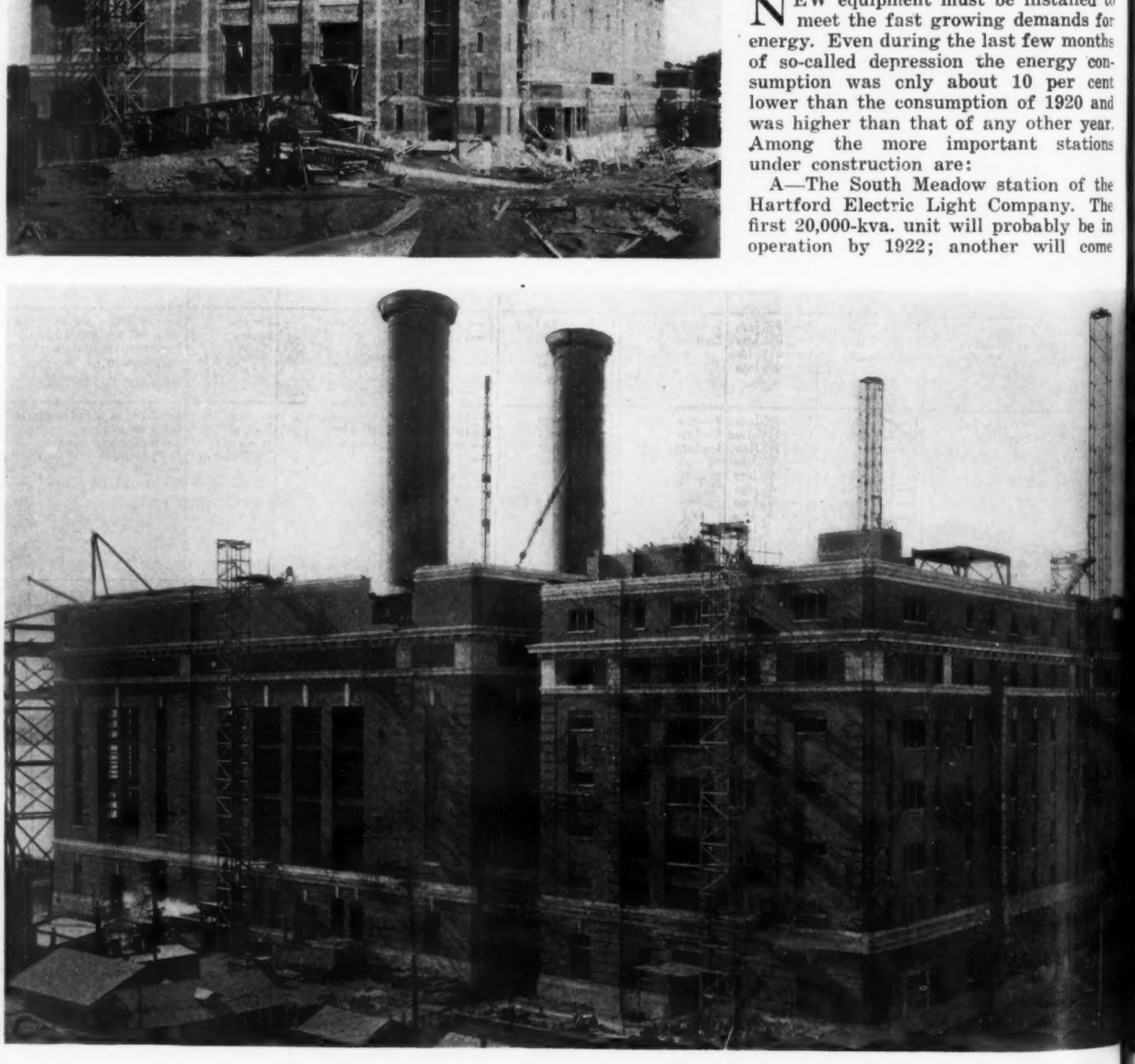




Construction Has Never Stopped in the Central Station Field

NEW equipment must be installed to meet the fast growing demands for energy. Even during the last few months of so-called depression the energy consumption was only about 10 per cent lower than the consumption of 1920 and was higher than that of any other year. Among the more important stations under construction are:

A—The South Meadow station of the Hartford Electric Light Company. The first 20,000-kva. unit will probably be in operation by 1922; another will come



later. Stone & Webster are the designers.

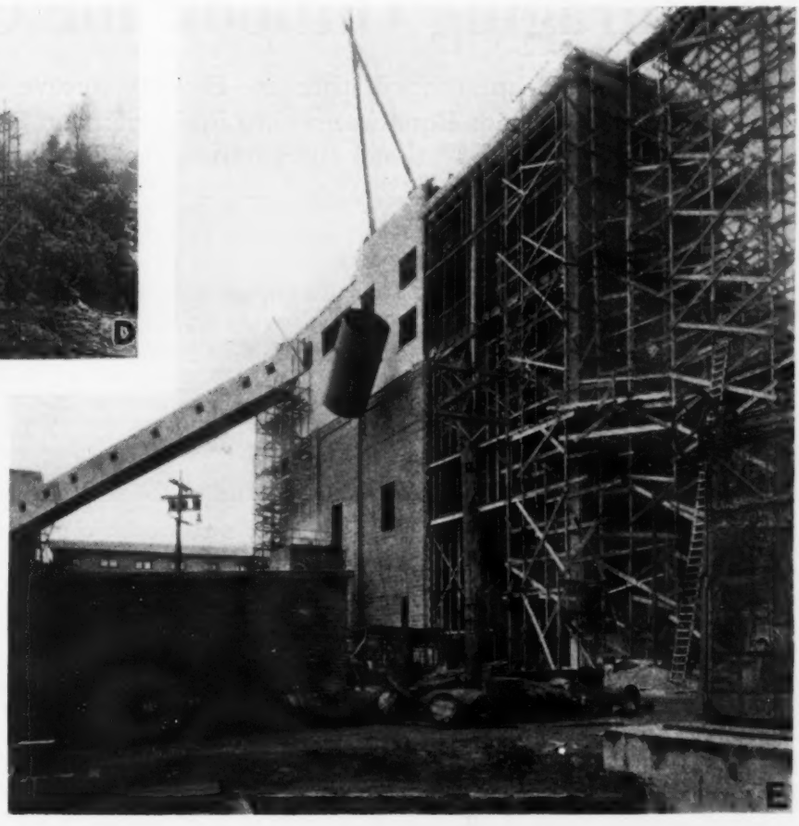
B—100,000-kw Steel Point station of United Illuminating Company, Bridgeport, Conn., Westcott & Mapes, designers.

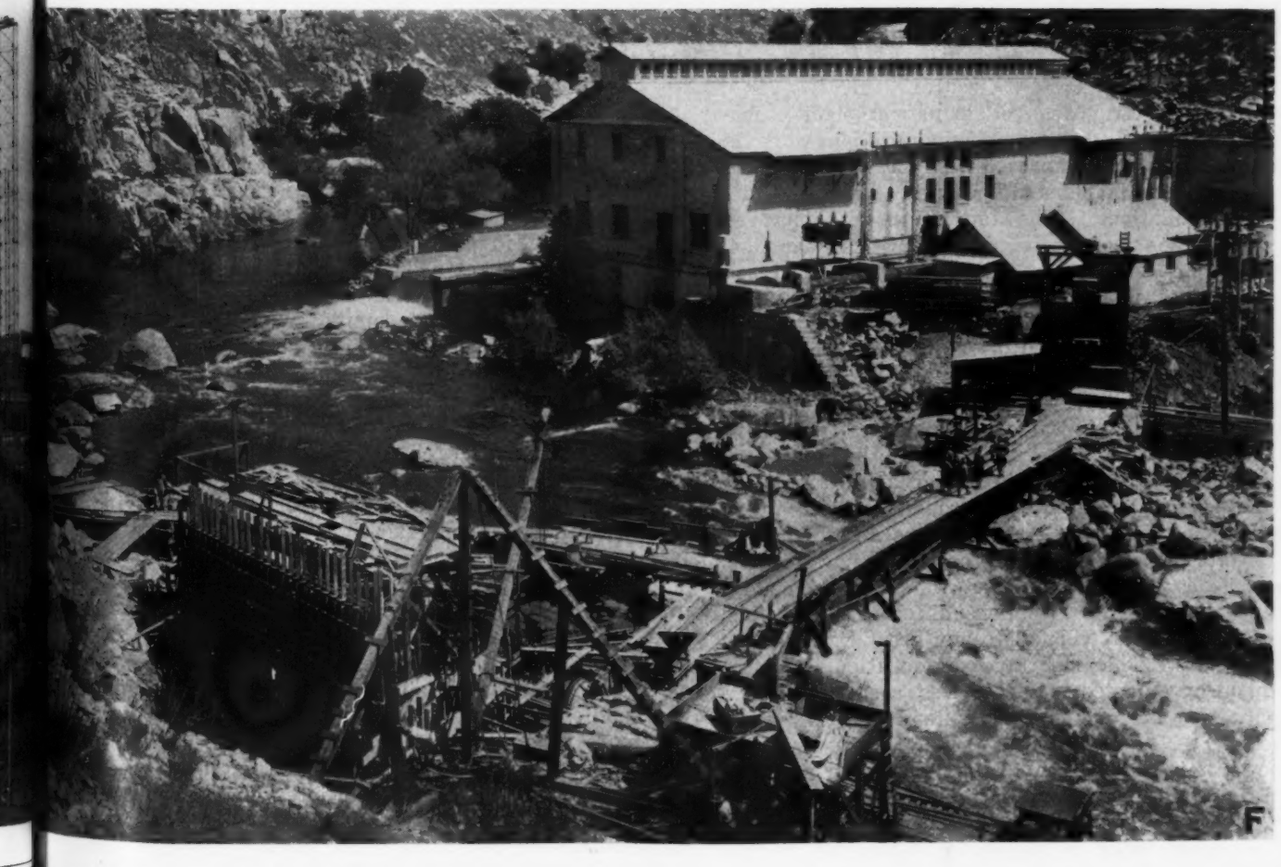
C—Hell Gate station of the United Electric Light & Power Company, rated at 280,000 kw. Built by Thomas E. Murray, Inc.

D—Big Creek No. 8 plant of the Southern California Edison Company, 22,500 kw. Structure at rear is for 220,000-volt transformers, oil switches and buses.

E—Station of the Fitchburg (Mass.) Gas & Electric Company, built by Charles H. Tenney.

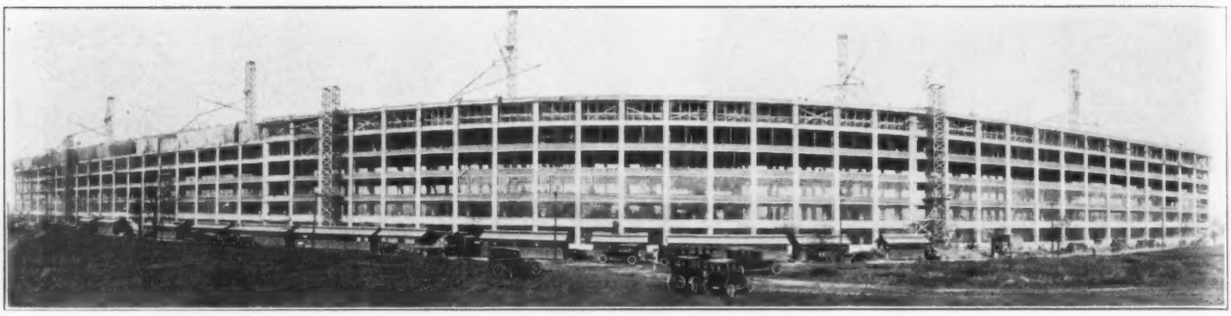
F—12,000-hp. plant of San Joaquin Light & Power Corporation on Kern River.





Encouraging Outlook for Construction

Unprecedented Requests for Estimates—Healthy Recovery of Business, However, Demands Equalization of Liquidation and Settlement of National and International Problems



HALF MILLION DOLLARS IN ELECTRICAL EQUIPMENT GOING INTO THIS PLANT*

GRADUAL increase of activity in consulting engineering and electrical construction is reported by various prominent engineering organizations interviewed by the ELECTRICAL WORLD recently, and most of them are of the opinion that resumption of business on a larger scale will set in as soon as there has been an equalization of liquidation and a settlement of certain national and international problems. Some of the large houses are handling close to a "normal" pre-war business, but 40 to 50 per cent of normal is more nearly the average. Much of the existing business is coming from New England and the Middle Atlantic States, but the Middle West holds forth great prospects.

Important investigations of industrial plant economy are under way, including rehabilitation work in diversified industries, improved power distribution and betterment work in old and inefficient hydraulic generating installations. The importance of improved illumination is also receiving broader consideration, and the transformation of industrial plants designed for war service and often built under great stress into layouts suitable for peace-time industries is occupying engineering attention. Little complaint of collection conditions is heard in engineering circles, payment within thirty to sixty days of invoice being common.

In most cases it appears that a general expansion of engineering work accompanied by the bringing to a head of many projects held in abeyance will take place as renewed confidence spreads throughout the country. California is cited by one engineer as an example of this. Not a few engineers hold that prices now warrant going ahead with long-deferred work, and some are thus advising clients. Opinions differ as to whether materials and labor will fall to any great extent below present levels. The importance of deflation is almost unanimously accepted. Low prices are essential to business recovery and marks-ups tend to chill buying interest.

One prominent engineer points out that unskilled labor on some inland construction work away from cities has now reached a 35-cent-per-hour rate—a very complete index of liquidation. Gradual further reductions in wages of skilled trades are expected by several engineers. Almost all agree that labor is far more efficient than a year or two ago and more disposed to appreciate changed conditions.

It should be encouraging to know that the value† of contracts let for construction, exclusive of industrial buildings and residences, has exceeded the 1920 figures in four of the eight months past. Furthermore, statistics show that federal, state and municipal construction is relatively strong. Most of the projects have been in the nature of institutions or public buildings, such as hotels, schools, hospitals and similar structures. It is this class of work on which electrical contractors are now chiefly engaged. While the building constructors will be the first to feel new activity, it should be only a short time before the electrical contractors, jobbers and manufacturers will benefit.

Although activity in the field of the central-station company may be spotty, very few are in the position of being overequipped, so that when the process of business recovery becomes more rapid the necessity for enforced extension, development and rehabilitation will be evident.

Another significant fact is that some of the leading consulting engineers in the country report that they are receiving an unprecedented number of requests for reports and estimates on new work. If business conditions continue to improve, which most observers believe is the tendency now, the estimates that consulting engineers are making should be followed by construction activity that will keep every one busy.

There is a great danger that these signs of reviving business will make many "sit tight" and cease the readjustment of business conditions that is still necessary if a permanent healthy growth is to be expected. The present situation demands a revised type of business thinking, more participation in the settlement of national and international problems, a recognition of some of the economic laws that have been overlooked in the past, and a willingness to take a loss right now before any more time passes if liquidation in the particular business conducted has not gone far enough.

An analysis of the figures and interviews which have

*This is the Fisher Body Works at Cleveland, Ohio. The Thompson-Starrett Company was the building constructor and L. K. Comstock installed the lighting.

†See Table I on page 723.

been mentioned disclose some interesting facts. For example, the value of industrial construction contracts let for the last eight months is only about one-fifth of that for the same period of 1920, although the ratio has increased to nearly one-third recently (see Table I). Dormancy in industrial construction is not surprising because the enormous expansion of some plants during the war has left them overequipped for handling their product even were there no depression now. Furthermore, many industries which expanded only normally or which were handicapped in making necessary extensions during the war do not feel inclined to make additions now that demands for their products do not require it and since money rates are high. However, the latter may be expected to build as soon as business conditions improve a little more, and the overbuilt group, which were mostly equipped for special work like munitions manufacture, etc., will have to adapt their plants to new purposes.

While the statistics on contracts let and the reports by consulting engineers of unprecedented calls for estimates indicate that better business is coming, certain conditions still exist which are delaying business recovery. If they are not generally recognized and adjusted, business recovery will be slow. If they are taken in hand, recovery will be rapid. Many will say that the principal factors are labor and materials expense, excessive money rates, freight rates, etc. These may be the immediate things involved, but they are so inextricably tied up with unchangeable economic laws and national and international affairs that they cannot be considered by themselves in looking for business stimulus. Only so soon as the majority of people in this country recognize this fact and compel others to do likewise will business recovery strike a healthy pace.

TABLE I—VALUE OF CONSTRUCTION CONTRACTS LET BETWEEN JAN. 1 AND SEPT. 1 FOR 1920 AND 1921*

(Only that class of construction in which electrical work will figure prominently has been included. Residence construction is not included.) Roman figures refer to 1920, boldface figures to 1921.

	Industrial	Ratio of 1921 to 1920 Per Cent	Buildings	Ratio of 1921 to 1920 Per Cent	Federal	Ratio of 1921 to 1920 Per Cent
January	$56,041,047	23	$87,095,987	20	$4,980,945	40
	12,881,968		**17,455,673**		**2,071,141**	
February	63,262,290	7.5	52,200,466	61	2,282,373	69
	4,737,850		**31,902,608**		**1,574,927**	
March	48,861,832	31	47,541,078	120	1,483,605	242
	15,032,130		**56,520,231**		**3,590,617**	
April	65,879,005	15.3	90,776,835	57	4,124,269	28.8
	9,346,586		**51,647,900**		**1,186,403**	
May	39,661,869	19.7	70,946,738	68.3	1,167,045	155
	7,799,584		**48,442,471**		**1,809,588**	
June	40,453,500	15.1	31,271,042	180	2,625,739	158
	6,111,307		**56,576,768**		**4,158,430**	
July	30,968,900	22	38,947,190	117	4,431,976	76
	6,781,369		**45,452,153**		**3,382,964**	
August	25,941,992	27.8	33,492,290	150	1,678,499	80
	7,210,378		**56,475,001**		**1,355,545**	
Total 1920	371,159,543	18.8	452,271,626	79	22,783,451	84
1921	**69,901,172**		**358,472,805**		**19,729,615**	

*Based on data compiled by the *Engineering News-Record*.

Obviously prosperity requires that the average citizen shall have an income which will provide money for all his necessary requirements. This condition cannot exist if the earning power of any large group of people goes down or remains constant while the price of many required commodities goes up excessively or stays at a prohibitive level. In such a case, if the entire income of this group is being expended for necessities, those who compose it will cut down on the use of commodities which have increased excessively in price and the producer of those commodities will suffer.

Briefly, this is the situation today. If the prices of commodities, labor and money in a normal year (say 1913), are considered as 100 per cent and their fluctuations since that time are plotted, it will be found that they have not liquidated to within the same percentage of normal. By July 1, 1921, farm products had liquidated to within 8.9 per cent of normal (1913), food within 17.1 per cent, metals and metal products within 20.4 per cent, cloth and clothing within 31.3 per cent, and miscellaneous within 34.1 per cent, whereas lumber and building materials is only within 42.3 per cent of normal, chemicals and drugs within 43.5 per cent, fuel within 47.3 per cent, and household furnishings within only 55.3 per cent. Thus it may be observed that the farmer, who has liquidated the most, does not have the income required to buy commodities which have not liquidated so much. The producer of cloth and clothing is better off than the farmer, but he has liquidated more than the producers of chemicals and drugs, lumber and building materials and household furnishings, and so on.

If every person selling service, commodities or money will take the foregoing statement of conditions into consideration and adjust his prices accordingly, he will go a long way toward establishing better business for himself. This does not necessarily mean that all prices have to come down. Some may have liquidated enough already, in which case the others will have to come down to meet them, or it may be that some have liquidated too much and must raise prices to meet the others. It may mean that some must take a loss, but the man who knows when to take a loss and who acts on this knowledge will always be in a better situation than one who delays. In judging how much to liquidate it is considered a good business rule by engineers who have been interviewed in the preparation of this article to dispose of products on hand at a price which will net a fair profit above the present replacement value. The difference between this revised selling price and the one at which the producer would like to sell must be charged to profit and loss and forgotten. The quicker the better.

Business Uncertainty Demands Settlement of National Questions

Aside from involving the economic relations just set forth, better business requires that the existing uncertainty in the minds of all regarding business be eliminated. Uncertainty regarding risk is one cause of high money rates. It is the cause of people holding on to what money they have. It is the cause of delayed industrial building where the companies have the money available. In the opinion of men whom the ELECTRICAL WORLD has interviewed most of the uncertainty that exists could be eliminated if certain of our national and international problems could be settled.

For example, there is the tax problem. The excess-profits tax, income supertaxes and tax-free bonds are taking most of the money that was formerly available for reinvestment in engineering undertakings. Until taxes are modified considerably and fewer bonds are issued exempt from taxation, financial support in engineering undertakings cannot be expected from the capitalists who have and always must be depended on for the bulk of the money required for new undertakings.

Then there is the tariff situation. Despite the fact that many of the men interviewed have been affiliated with the Republican party for years, they were quite generally in favor of low enough import tariffs on foreign commodities which we need to enable debtor

countries to sell goods here and in that way establish credit for buying our products. Only in this way can we expect to develop foreign trade.

Lack of decision on peace terms and armament and reckless and extravagant expenditure of money for government purposes are suggested by some engineers as other deterrents to better business. Railroads are also inextricably tied up in the prosperity of the country. If their executives' hands are unshackled from government restrictions the railroads can remedy their own troubles, most engineers believe. When they prosper, prosperity will be passed along to railroad equipment and steel producers; more labor will be employed and more money will be put into circulation to produce more wealth. Hence an endless chain of benefit results which will stimulate business as a whole.

INDUSTRIAL AND PUBLIC UTILITY PROSPERITY MUST COEXIST

Last but not least, the prosperity of electric service companies must be assured by allowing a more attractive return on the investment in order to allow them to pay the high security rates demanded. This does not necessarily mean higher rates. By allowing the companies to share in the savings effected through new economies there will be an incentive to seek new methods of economizing where there was no incentive before because of the limited rate allowed to be earned on the investment. Through increased earning power public utilities should be able to obtain capital more easily, and through an incentive for greater economy they should be able to pass part of the benefits to their customers who represent industry.

The foregoing outline of the fundamental requirements for better business is based on views expressed by engineering firms such as Sanderson & Porter, Hugh L. Cooper, the Thompson-Starrett Company, the J. G. White Engineering Corporation, Dwight P. Robinson & Company, Inc., L. K. Comstock, Lockwood-Greene & Company, Peet & Powers, H. W. Buck, Westcott & Mapes, Inc., John F. Vaughan, the Harry M. Hope Engineering Company, Charles H. Tenney & Company, French & Hubbard, Monks & Johnson, and Stone & Webster. Others will be quoted in the paragraphs that follow:

UTILITIES MUST BE READY FOR BUSINESS RECOVERY

W. S. BARSTOW, NEW YORK—You inquire as to what is the matter with the electrical industry. I cannot see that there is anything unusual happening. In the period of readjustment all industries must adjust themselves to normal conditions The electrical industry is perhaps the least affected because it has not been overdeveloped and its field is constantly expanding even in periods of depression. What concerns power companies at this time is to know what plans can be carried out to provide for the large demand upon the industry which will surely result when the period of readjustment has passed. Although the demand for power in some cases has fallen off, the customers are still connected and the gradual increase of the new business is slowly but surely using up spare capacity, so that when normal times come and general business revives, a period of very active power development must take place. It is well to make plans now to anticipate as far as financial conditions will permit future demands which are sure to come and should be economically supplied when the time arrives.

COL. H. M. BYLLESBY, CHICAGO.—I recently stated to a number of our executives and securities salesmen that the situation with respect to electric light and power companies was the best I had ever known in all of my forty years' connection with the electrical industry. By this I do not mean that these industries are reaping undue profits or enjoying a sudden flush of prosperity. They are simply coming into their rightful position as vital economic instrumentalities rendering indispensable service and providing the soundest kind of investment for the funds of capitalist and wage earner alike. The people generally realize these facts now as never before. A proper conception of our obligations and duties as public utility operators and skillful, common-sense management are all that are necessary to assure prosperity to the electrical industry for many years in the future.

Construction activities will proceed at a pace attuned to the relative cost of new money and the price of materials and labor. The growing demands for additional service make imperative a certain amount of extensions and improvements. Many of these cannot be postponed. There is a vast quantity of work ahead for all connected with the electrical industry, and as interest rates and commodity prices more nearly approximate a long time average, the greater will be the new construction placed under way.

The further pronounced development of the electric light and power and gas companies which is now assured has been the result—and, to a far larger extent than the casual observer appreciates, the solution—of the equity financing of these corporations, which has been so markedly carried forward by the various subsidiaries of our general organization, and which is likewise, wth equally marked success.

TABLE II—SOME EXAMPLES OF ELECTRICAL CONSTRUCTION UNDER WAY OR COMPLETED SINCE OCT. 1, 1920

POWER PLANTS:
- 500,000 hp., Chippawa-Queenston plant, Hydro-Electric Power Commission of Ontario
- 280,000 kw., Hell Gate station, United Electric Light & Power Company
- 270,000 kva. (ultimate) Ruby plant on Skagit River, city of Seattle
- 180,000 kw. Delaware, Philadelphia Electric Company
- 150,000 kw., Big Creek No. 3, Southern California Edison Company
- 120,000 kw., Westport, Consolidated Gas, Electric Light & Power Company
- 100,000 kw., Bridgeport, (Conn.) United Illuminating Company
- 100,000 kw., Extension, Niagara Falls Power Company
- 100,000 hp. Coosa River, Alabama Power Company
- 60,000 kw., (300,000 kw. ultimate) Colfax, Duquesne Light Company
- 60,000 kw., (180,000 kw. ultimate) Calumet, Commonwealth Edison
- 50,000 hp., Kerckhoff, San Joaquin Light & Power Corporation
- 45,000 kva., unit added, Detroit Edison Company
- 40,000 kw., Battle Creek, Consumers' Power Company
- 40,000 kw., Great Western Power Company
- 40,000 kva., Meadow Station, Hartford (Conn.) Electric Light Company
- 35,000 kva., city of Los Angeles
- 35,000 kw., $1,000,000 improvements raise rating to this value, Arkansas Valley Railway, Light & Power
- 32,000 kw., Kern River No. 3, Southern California Edison Company
- 30,000 kw., Dodge Brothers, cost $3,500,000
- 30,000 kw., unit added, Cincinnati Gas & Electric Company
- 22,500 kw., Big Creek No. 8, Southern California Edison
- 12,500 kw., Buttonwillow, Cal., San Joaquin Light & Power Corporation
- 14,500 hp., Washington Water Power Company
- 12,000 hp., Kern River, San Joaquin Light & Power Corporation
- Columbus, Delaware & Marion Electric Company, $2,000,000 station
- Penn Public Service Company, station at Seward, Pa.
- Searsburg, Vt., plant of New England Power Company
- 20,000-kw. addition to plant of Edison Gas & Electric Company, New Bedford, Mass.
- Salem, (Mass.) Electric Lighting Company enlarging plant
- 5,000 kva., addition, Eastern Texas Electric Company

SUBSTATIONS:
- San Joaquin Light & Power Corporation
- Duquesne Light Company, Pittsburgh, Pa.
- 2,400-kw. rotary-converter substation, United Railroads, San Francisco

TRANSMISSION LINES:
- 186-mile, 165,000-volt line, Great Western Power Company
- 195-mile, 220,000-volt line, Southern California Edison Company
- 20-mile, 33,000-volt line, Arkansas Light & Power Company

STREET AND PARK LIGHTING:
- Street Lighting, Lima, Ohio, $130,000
- Street lighting, Twin Falls, Idaho
- Park lighting, Cleveland, Ohio

INDUSTRIAL PLANTS:
- Great Falls Manufacturing Company, Somersworth, N. H., 840 looms and 55,000 spindles, Lockwood, Greene & Company
- Westinghouse Lamp Company and factory, Indianapolis, Ind., Dwight P. Robinson & Company, Inc.
- Fisher Body Plant, Cleveland, Ohio, $500,000 of electrical equipment, part of which was installed by L. K. Comstock
- Kelley Tire & Rubber Company, New Haven, Conn., Monks & Johnson, Engineers
- United Enameled Ware Company, Chattanooga, Tenn., $100,000 in mechanical and electrical equipment, Dwight P. Robinson & Company, Inc.
- Mississippi Glass Company, Floreffe, Pa., extension with $100,000 in mechanical equipment installed by Dwight P. Robinson & Company, Inc.
- Corning (N. Y.) Glass Company, $200,000 in mechanical equipment put in by Dwight P. Robinson & Company, Inc.

being carried forward by other large holding operating companies.

NORWOOD-NOONAN COMPANY, CHICAGO.—There are three classes of construction work that must be considered at the present time. General industries were subject to forced development during the war and to some extent at least suffered from overdevelopment. From these industries, with the possible exception of the cement industry, no construction work can be expected until the recovery in business conditions allows them to catch up with their development. The second class, including railroads, municipalities and industries not allied with war activities, suffered a stoppage of its normal development during the war. As a result it is short of facilities and will proceed with construction work as soon as prices reach a stable condition and in many cases even before that time, because facilities are now inadequate and the cost of construction will be a minor consideration. The third class is the purely speculative building project. This will probably not recover until prices have gone to the lowest possible level, since profits depend on the possibility of building at the lowest possible costs. Conditions are now at the point where there is a marked awakening of interest in the second class, and we look for a steady upward trend in the construction work to supply needed facilities. The price stabilization needed to start this movement is fairly well established, though there are many items that will have to drop in price and a new demand be created before a boom of the old-time type can be expected. As a consequence the recovery will be slow but all the more healthy because of its slowness.

TABLE III—WHERE SOME ENGINEERS CONSIDER FURTHER ADJUSTMENTS ARE NECESSARY

Remark	Opinion of
Retail and semi-retail prices in brick, lumber and cement, building trade labor and common labor should suffer a reduction of at least $2 per day. Cost of building still 30 per cent higher than in 1916	R. D. Coombs, New York
Labor is 33⅓ per cent too high yet	W. S. Berry, San Francisco
Skilled labor is 10 to 15 per cent too high	Barney & Ahlers, New York
Building materials and machinery	H. W. Buck, New York
Skilled mechanics and materials	Aberthaw Construction Co., Boston
Do not believe that prices of labor and material stand in way of development	Huntington & Guerry
Timber, cement and construction labor is 25 per cent too high	Holbrook, Cabot & Rollins, Boston
Electrical equipment, freight rates and attitude of labor	Scofield Engineering Company, Philadelphia
Cement and freight rates	J. W. Fraser & Co., Charlotte, N. C.
Cement and freight rates, but not at expense of service Skilled labor 25 per cent too high	C. A. Mees, Charlotte, N. C.
Skilled labor should get within 25 per cent of pre-war price	G. S. Williams, Ann Arbor, Mich.
Freight rates, labor, steam and hydraulic machinery	C. O. Lenz, New York

HUNTINGTON & GUERRY, GREENVILLE, S. C.—We have pending contracts awaiting improved conditions to the amount of possibly $80,000 or $100,000. We do not believe that prices of labor and material are at present standing in the way of the development of our business. Our industrial work, which comprises the larger part of our business, is almost entirely with the textile mills. These mills are, as most people know, one of the basic industries of the country, and further investment by them depends upon the improvement of their market. The improvement of our local business depends, of course, upon the improvement of local conditions, which down here is largely a matter of the price of cotton. Since cotton has advanced strongly in the last month, we have noticed an improvement, but we do not expect entirely satisfactory business conditions until more cotton is sold and the market therefor becomes stable.

We have no particular suggestion to make for helping the recovery of business by the electrical industry beyond joining in the efforts that are being made by all substantial business interests at the present time to bring about mutual confidence and stabilize market and labor conditions.

PIEDMONT ELECTRIC COMPANY, ASHEVILLE, N. C.—Frankly we don't believe there is any such animal as "normal business." What might be normal today would be abnormal next year or vice versa, and we have already had too much looking back when all of our business lies now ahead of us. Let us cut out this habit, which is so closely related to the trouble Lot's wife had, for, if persisted in, it will surely leave a salty taste with us.

The progress of electrical work is so interconnected with other businesses that the electrical business cannot separately and independently of those related businesses speed up on its own account. We have in mind general construction, building and increased housing facilities, all of which have a direct bearing on the speeding up of electrical business in general.

Through the section of the country we operate in, the Carolinas, the price of cotton has had a debilitating effect on all business, but with the advance in price on account of the short crop confidence will be restored, and that means a general speeding up of all business.

Your question as to what legislative action could help the electrical business causes me to suggest that our various states should enact laws that would conserve the use of electrical power in the state wherein it is developed, for nothing in our opinion will assist more in rapidly building up any state as hydro-electrical developments, making available a continuous source of power at a low rate.

To help the electrical business in general under present conditions, we could suggest nothing better than that we revise our ideas of selling; in other words, project our thoughts beyond the mere materials that we sell to the advantages that would be obtained by the purchase and assembling of those materials. We are confident that if every man in the electrical business or having any connection with it would at this time think how he could help his customer in his business by having him utilize electricity, there would be a revival of buying in many lines which are now uselessly waiting for the buyer to come and ask for service.

MEES & MEES, CHARLOTTE, N. C.—The following subjects need attention:

Financial.—The hoarding of gold and the consequent maintenance of high prices for money should be stopped. Confidence will not return as it should as long as business feels that the Federal Reserve Board may again at any time inflict its deflation policies on those who assume the legitimate risks without which no progress can be made. This is of paramount importance.

Legislative.—We have still too much government interference of the unintelligent variety. All competitive governmental activities should be stopped. Governmental economy is essential. Excess-profits taxes should be revoked.

Labor.—The restrictive practices of organized labor as to output and segregation of duties must be stopped. The open shop is the answer. This comes next in importance. Individual, efficient productivity alone will bring the world out of chaos.

Tariff.—A high protective tariff will help 80 per cent of the nation's business even though it reacts against the 20 per cent of export business.

Every member of Congress should be informed of these demands in language which he understands to the end that in self-preservation he will espouse these requests.

J. W. FRASER & COMPANY, CHARLOTTE, N. C.—About twelve mills, mostly new, have been completed in which motors, transformers, switches and motor-driven fire pumps are used. The owners of small water powers in a good many cases are considering development, and the owners of small powers which were developed a good many years ago are considering the advisability of rehabilitating these powers in such a way as to get the maximum power available. In old plants wheels of inefficient design are being replaced by new wheels of more efficient type.

Our business is nearly all with cotton mills and power companies. Of course, we get perhaps 25 per cent from other sources, but when cotton-mill business is bad virtually

everything else is inactive down here. If the price of cotton would stay steady, say, at about 20 cents, we believe that the business depression in this section of the country would be at an end. I feel sure that the cotton mills would soon start to make extensions and that quite a number of mills which have been under contemplation would be built immediately.

BUSINESS DEPRESSION HAS PASSED THE PEAK

FRANK F. FOWLE, CHICAGO—Appraisal of the present condition and trend of business as a whole is productive of an optimistic feeling that the worst phase of depression is probably over and from now on there are excellent prospects of a slow but healthy resumption of activity. The necessary liquidation in labor and materials which always succeeds a period of general inflation—in the last instance the most excessive by far we have ever known—is usually accompanied by the severe shocks to the general business structure that characterize every cycle of prosperity and depression. In most lines of business this dip in the cycle seems to be past, although the railroads and some of the building trades possibly constitute an exception. In other lines, particularly the steel industry, there are signs of returning demand and activity. The oil and automotive industries are also exhibiting signs of recuperation. High-grade bonds and notes are stiffening in price, and the accompanying decline of the recent exceptional interest yields is a very healthy sign. Non-employment continues to be prevalent, but can be reduced by a general return of labor to its pre-war occupations, as well as increased demand resulting from more normal wage scales and the renewed flow of capital into new enterprises and extensions. Public utilities will inevitably reflect the improved tone of business in general. What the country needs as almost never before is a stanch faith in the return of prosperity, such as perhaps we have lacked the courage to conceive, and a general willingness on all sides to make the temporary sacrifices in luxury or scale of living necessary to insure its early realization. No one can reasonably doubt that the worldwide destruction of man-power and wealth in the great war must be made up again by hard work and plenty of it, with generous reward for all who have the vision to comprehend the situation and do their part.

Actual 1921 Additions to Systems Will Total $214,818,000

"Electrical World" Survey Indicates that Actual Expenditures for System Extensions of Electric Light and Power Companies During 1921 Will Be 95.8 per Cent of the Aggregate Estimates Made at the Beginning of the Year

RESULTS of a survey just completed by the ELECTRICAL WORLD covering the electric light and power industry indicate that the system extensions proposed for the year 1921 will in the aggregate come within 4.8 per cent of realization. In the May 28 issue of the ELECTRICAL WORLD were published the results of a similar survey to ascertain the estimated or proposed extensions to generating plants and transmission and distribution systems during 1921. This survey indicated that $225,770,000 would be spent by the electric light and power industry if the new construction plans for the year were carried to completion. Since these estimates for the year were published the industries of the country have passed through the most severe depression on record. Proposed additions for 1921 have "gone by the board" and in their place have come curtailments of all kinds.

Although few central-station companies have reported that only a small proportion of their extensions contemplated for 1921 will materialize, the majority of others have reported expenditures considerably in excess of those estimated at the opening of the year. In the aggregate the returns indicated that the expenditures of the electric light and power companies for actual extensions to their systems during 1921 would fall about 4.8 per cent below the proposed expenditures.

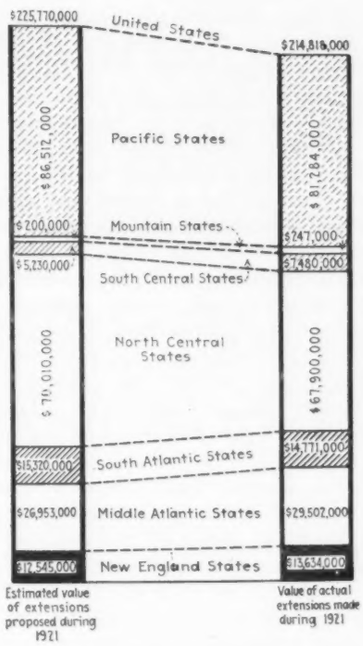
Taking the United States as a whole, the item of "transmission systems" shows an increase over the proposed expenditures for 1921 of 8 per cent. The total of $60,067,000 for transmission systems is $4,385,000 in excess of the value of the proposed extensions for the year. Steam-electric generating-plant extensions will total $49,858,000, or $528,000 below the value of the proposed extensions. Hydro-electric generating plant additions will amount to $45,808,000, which is a decrease of $7,941,000. The value of additions to all distribution systems is $59,077,000, or $6,875,000 below the proposed additions for the year.

Steam electric plant additions in the Middle Atlantic States will exceed the proposed additions by 62 per

VALUE OF PROPOSED AND ACTUAL ADDITIONS TO ALL CENTRAL GENERATING AND DISTRIBUTING SYSTEMS DURING 1921 AS ESTIMATED BY THE "ELECTRICAL WORLD"

	Steam-Electric Generating Plants		Hydro-Electric Generating Plants		Transmission Systems		Distribution Systems		Total Value of All Additions Completed During 1921	
United States and Sections	Estimated Value of Additions (Estimate Made in March, 1921)	Value of Additions Actually Completed During 1921	Estimated Value of Additions (Estimate Made in March 1921)	Value of Additions Actually Completed During 1921	Estimated Value of Additions (Estimate Made in March 1921)	Value of Additions Actually Completed During 1921	Estimated Value of Additions (Estimate Made in March 1921)	Value of Additions Actually Completed During 1921	Estimated in March 1921	Additions Actually Completed During 1921
New England	$7,980,000	$8,085,000	$1,480,000	$1,480,000	$802,000	$1,440,000	$2,283,000	$2,629,000	$12,545,000	$13,634,000
Middle Atlantic	6,480,000	10,430,000	773,000	2,458,000	10,080,000	8,240,000	9,620,000	8,374,000	26,953,000	29,502,000
South Atlantic	5,110,000	5,004,000	.....	.....	6,650,000	6,197,000	3,560,000	3,570,000	15,320,000	14,771,000
North Central	27,000,000	22,020,000	2,340,000	2,680,000	21,950,000	20,510,000	27,720,000	22,690,000	79,010,000	67,900,000
South Central	1,030,000	1,920,000	1,110,000	1,110,000	1,800,000	2,230,000	1,290,000	2,220,000	5,230,000	7,480,000
Mountain	75,000	72,000	46,000	58,000	.....	.....	79,000	117,000	200,000	247,000
Pacific	2,712,000	2,327,000	48,000,000	38,030,000	14,400,000	21,450,000	21,400,000	19,477,000	86,512,000	81,284,000
United States	$50,387,000	$49,858,000	$53,749,000	$45,808,000	$55,682,000	$60,067,000	$65,952,000	$59,077,000	$225,770,000	$214,818,000

cent, while in the North Central States the actual additions will be 15 per cent below the proposed additions. In other sections of the country it appears that additions to steam-electric generating plants will be very close to the additions proposed at the beginning of the year. The large decrease below the proposed additions to hydro-electric plants is confined almost exclusively to the Pacific States and is due in large part to an overestimate of the additions to be completed during the year by one of the larger companies of that section. In the Middle Atlantic States, on the other hand, the proposed additions will be exceeded by almost $2,000,000.



ACTUAL ADDITIONS ONLY SLIGHTLY BELOW PROPOSED ADDITIONS IN ALL SECTIONS

Actual additions to the transmission systems of the Pacific States during 1921 will exceed the proposed additions by $7,000,000, other sections keeping fairly close to that proposed at the opening of the year.

HOW THE ELECTRIC LIGHT AND POWER "EXTENSIONS DOLLAR" IS BEING DISTRIBUTED IN 1921

Large curtailments in the proposed additions to distribution systems were reported by several companies in both the North Central and the Pacific States, but these were partially overcome in the aggregate by expenditures in excess of those proposed by companies in some of the other sections.

Taken as a barometer of activity within the electric light and power industry, these figures point in no uncertain manner to much larger things in the future. The figure of $214,818,000 expended for system additions means that approximately $400,000,000 more will be called for in service appliances. If these things can be accomplished during a period of unprecedented industrial and business depression and a period of greatly restricted buying power, the future of electric public utilities when conditions return to normal cannot help to show a development exceeding by far that of any period in the past.

Proposed Plants Would Complete Development of Bear River

AN ANALYSIS of the data submitted by the Utah Power & Light Company in connection with its project on Bear River in Idaho has been made by the engineers of the Federal Power Commission. The Commission recently granted a preliminary permit to the company for the development of four power sites on Bear River. These sites when developed as proposed by the permittee will complete the utilization of Bear River for power purposes at all practicable points from Bear Lake to Great Salt Lake, into which the river empties. The river then will be one of the most completely utilized streams in the West for power purposes as well as irrigation.

The present power developments of the Utah Power & Light Company on Bear River are four in number—the Grace plant, about 12 miles below Soda Point, having a capacity of 35,000 kw.; immediately below this lies the Cove plant, with 7,500 kw., and joining this, just below, the Oneida plant, with an installed capacity of 30,000 kw., while further down the river and below the Logan Valley is the Wheelon plant, with 7,125 kw.

Of the four locations for which the company was granted preliminary permits two lie above the Grace plant and two below the Oneida plant. The two upper sites, Soda Point and Lava, will have effective heads of 75 ft. and 85 ft. respectively, and each will have a primary capacity of about 4,700 kw. The dams erected at these two points, and especially the one at Soda Point, will furnish storage facilities that will make it possible to regulate the daily fluctuations in power and irrigation demand. The other two locations under permit are the so-called Narrows and Mink sites, which lie immediately below the Oneida power plant and will utilize all the available fall between that plant and the head of the Logan Valley. These points will have a primary capacity of about 3,100 kw. and 4,200 kw. respectively. The reservoirs behind these dams will also be of sufficient capacity to supply the daily fluctuations in power and irrigation demand. Thus, within a short distance, Bear River will eventually have six small regulating reservoirs—the Grace and Oneida ponds in addition to the four above named.

The four new power sites will therefore add 21,500 hp. to the generating capacity of the company's system, which at the present time has a hydro-electric capacity of about 165,000 hp. They will be connected with the main transmission systems now operating at 130,000 volts, extending from the Grace plant in Idaho to Salt Lake City, Utah, a distance of 134 miles.

Readers' Views and Comments

This is a readers' forum. Comments on questions before the electrical industry presenting economic, financial, engineering or commercial aspects and new or supplementary viewpoints on published articles are cordially invited

Relation Between Street Lighting and Crime

To the Editors of the ELECTRICAL WORLD:

Early in the year 1916 a high-intensity ornamental lighting system was installed on the more important streets in the business section of Cleveland. This installation consisted of ornamental lanterns equipped with 1,000-cp. and 1,500-cp. tungsten lamps, spaced 80 ft. to 90 ft. apart on each side of the street. The original installation included approximately 600 posts and covered what came to be known as the "white way" district —a total of about 5 miles out of about 600 miles of paved street in the city.

There were two principal motives which led to the installation—first, the desire to benefit trade in the business district, and, second, to facilitate the handling of the increasingly dense vehicular traffic. The possible effect of the improved illumination in reducing crime was scarcely considered, for the existing system of lighting with arc lamps was as good as that which obtained in the rest of the city, and one seldom looks upon the business district as a crime center. However, the widespread increase in such crimes as assaults, hold-ups and automobile stealing in the past few years has focused attention upon these matters, and it was this that led to a survey of the street crime situation in Cleveland covering both the city as a whole and the "white way" district. More than 1,000 cases of hold-up, assault to rob, burglary (stores entered from front), automobile stealing, pocket picking, etc., were included in this study of the Police Department records.

The first important point brought out was that more than 90 per cent of all such crimes took place after dark; the second was that before the new lighting was installed seventeen out of every hundred of these street crimes were committed in the small downtown area designated as the "white way" district, which embraced less than 1 per cent of the street mileage of the city. Third, and most important, street crimes committed after dark during the months of October, November and December of the year 1916, after the new lighting was installed, were compared with the corresponding months of the previous year so that the possible effect of the increased lighting as a deterrent to crime might be determined. In this connection it will be recalled that 1916 saw the virtual beginning of the crime wave and that crime was increasing by leaps and bounds in all sections of the country. In Cleveland in the areas outside of the "white way" district street crimes committed after dark increased 54 per cent over 1915, while crimes on the "white way" actually decreased 8 per cent in comparison with 1915. The accompanying table giving a summary of the data obtained is of special interest, for it shows very clearly the trend toward bolder and more serious crimes during 1916. As a matter of fact, the minor offences—larceny and pocket picking, etc.—actually decreased during the period when the major crimes nearly doubled.

COMPARISON OF CRIMES COMMITTED IN "WHITE WAY" AND IN OUTSIDE DISTRICT

	All Street Crimes		Major Street Crimes	
	Outside "White Way" District	Inside "White Way" District	Outside "White Way" District	Inside "White Way" District
1915.....	350	73	222	32
1916.....	539	67	434	37

Per cent change, Increase 54, Decrease, 8, Increase, 95, Increase 15

Limiting the comparison to major crimes—burglary, assault to rob, hold-up and automobile stealing—the comparison between the "white way" and the outside district changes very little. These major crimes increased 95 per cent in all of the outside territory; they increased but 15 per cent in the downtown section. To put it another way, crimes in the business section of Cleveland in the year 1916 were little more than one-half—to be exact, 59 per cent—of what we might well have expected had no change been made in the lighting.

In connection with the survey the engineering department wishes to acknowledge its indebtedness to the police department of the city of Cleveland, and particularly to Chief Frank W. Smith, through whose courtesy this survey was made possible.

National Lamp Works of General Electric Company, Nela Park, Cleveland.

WARD HARRISON, Illuminating Engineer.

Electrical Engineering Cannot Be Learned in Ten Weeks

To the Editors of the ELECTRICAL WORLD:

I should like to call your attention to what I consider of utmost importance, namely, suppression of the "fakery" that has sprung into being, especially during the last two years, regarding electrical engineering. All electrical engineers, of course, know that their profession must be learned either in college, supplemented by practical experience, or, as many have learned it, by extensive practical experience alone. In either case it takes "years," not months, weeks or days, to become expert in any of the diversified forms of electrical engineering. None the less, many magazines, technical, farm or popular, usually contain one or more "ads," emblazoned with a picture of Niagara's turbine alternators or similar views, stating that wonderful salaries can be made in electrical engineering simply by taking So and so's "practical course" (minus mathematics) of a few weeks' duration.

The writer took a course in an Eastern school of engineering with all of the "hard stuff" that some advertisers say is omitted in their courses and has had over six years' field work besides. Still, he is not yet drawing down "$10,000 per" or anything near it, although such salaries are commonplace in the "Promised Land" portrayed to the innocent beginners. Men like Dr. C. P. Steinmetz of the General Electric Company and B. G. Lamme of the Westinghouse Electric & Manufacturing Company doubtless draw large salaries; but genius like theirs doesn't come from correspondence courses of ten weeks' duration. I have great respect for the courses of the I. C. S. and similar accredited institutions. I am only attacking the "get-rich-quick" variety.

FRANK E. WOOLEY.

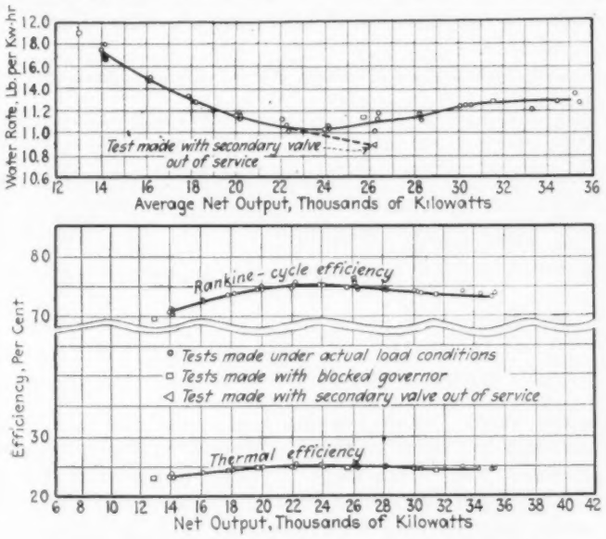
Fulton, N. Y.

Industrial and Station Practice

Installation, Operation and Maintenance of
Generating and Distribution Equipment and Economical Utilization of Electrical Energy
in Mills and Factories, Including Testing and Repair Methods

Tests on 30,000-Kw. Steam Turbines

SUMMARIES of tests made on three 30,000-kw. General Electric turbines installed during 1920 at the Fiftieth Street power station of the Interborough Rapid Transit Company, New York City, are shown in the accompanying table and curves. These turbines are of



WATER RATE AND EFFICIENCY OF 30,000-KW. TURBINE

the straight Curtiss impulse type, having twenty pressure stages, each pressure stage consisting of one velocity stage. The normal steam pressure at the throttle is 225 lb. per square inch, absolute, the steam being superheated 150 deg. Fahr., and exhausted into a vacuum of 29 in. of mercury. The speed is 1,500 r.p.m. In addition to the primary steam inlet a secondary valve is provided which opens after the load reaches 24,000 kw. and which enables the turbines to carry a load of 35,000 kw. The highest water rate obtained during the tests while operating under normal conditions was 11.03 lb. per kilowatt-hour, while the highest Rankine-cycle and thermal efficiencies obtained were 75.5 per cent and 25 per cent respectively.

TESTS ON 30,000-KW. TURBINE SHOW LOW WATER RATE

Load, Average Net Kw.	— Steam Pressures, Lb. per Sq.In. — Throttle	Turbine Head	Overload Seventh Stage	Heat Balance Connection, Sixteenth Stage	Water Rate*, Lb. per Kw.-Hr.	Rankine-Cycle Efficiency*, per Cent	Thermal Efficiency*, per Cent
14,175	236	136	81	8.08	11.66	71.36	23.64
18,243	227	166	99	10.25	11.28	73.76	24.44
23,945	233	207	124	13.75	11.03	75.43	25 00
28,249	225	211	159	18.71	11.11	74.89	24 81
30,289	225	222	161	17.20	11.23	74.09	24.55
35,467	224	216	193	21.53	11.27	73.82	24.46

* Corrected to 225 lb. per square inch absolute pressure, 150 deg. Fahr. superheat, 29 in. of mercury vacuum referred to 30-in. barometer at 58.1 deg. Fahr.

The turbine tested was installed on a new structural-steel foundation cased in concrete. As no expansion joint was provided between the turbine and condenser, novel spring supports for the condenser were provided.

The tests were conducted under the supervision of Herbert B. Reynolds, mechanical research engineer Motive Power Department, Interborough Rapid Transit Company.

How Gap, Temperature, Etc., Affect Voltage Test on Oil

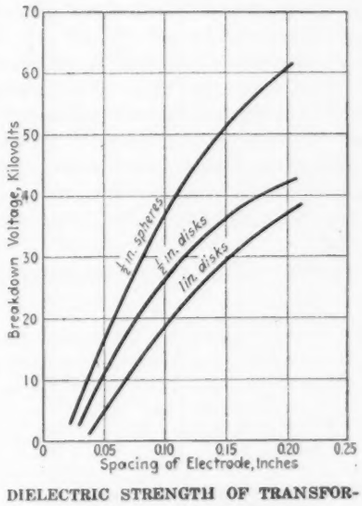
THE effect of various conditions when testing insulating oils was determined in some studies made recently by the American Society for Testing Materials. These conditions included the type of gap, the number of shots in one sample, circulation of oil and temperature. In brief the conclusions drawn were as follows:

1. The gap between 1-in. disks with horizontal axes is to be preferred because of the lower values of breakdown voltage and hence smaller testing equipment.

2. Spacings of less than 0.1 in. are undesirable because of the greater probable error of measurement made with such small gaps.

3. The results of measurements obtained with other forms of gap may be referred to the recommended standard gap by the factors given in the accompanying table.

4. The value of dielectric strength obtained from the first shot of each filling does not differ sufficiently from the values given by later shots in either its magnitude or repeatability to justify the practice of making only one shot on each filling.



DIELECTRIC STRENGTH OF TRANSFORMER OIL WITH DIFFERENT SHAPES OF ELECTRODES

5. A precision of approximately 3 per cent may be expected in the mean value of fifteen shots distributed over three fillings, provided no adjustment of length of gap is made. Uncertainties of 6 per cent may be introduced as a result of resetting the electrodes and from contamination introduced from day to day at a single laboratory. Differences as great as 12 per cent may arise even in careful work done at the different laboratories.

6. The circulation of oil past the electrodes does not appreciably affect the observed values of dielectric strength.

7. The temperature coefficient of the dielectric strength is approximately 0.13 kv. per degree C.

The bulk of the work consisted of parallel tests made at each of the three co-operating laboratories, namely, Vacuum Oil Company, Westinghouse Electric & Manufacturing Company, and the Bureau of Standards. A 5-gal. can of each of four grades of oil was sent to each of the three laboratories. Three styles of electrodes were used at each laboratory: (1) 1-in. disks placed with axes horizontal; (2) ½-in. disks with axes horizontal; (3) ½-in. spheres with axes vertical. With each type of electrode, four spacings, namely, 0.05-in.; 0.10-in. and 0.20-in., were used. With each gap, spacing and oil, three fillings of the cup were made, and five "shots" were made on each filling. In these tests the room temperature was kept as near 25 deg. C. as conveniently possible and the oil containers were not opened except when they were at a temperature at least as high as that of the room. A 60-cycle alternating voltage was applied and raised at an approximately uniform rate of 3,000 (effective) volts per second until breakdown occurred. The results are expressed in terms of the effective kilovolts of a sine wave having the same crest value as that at which breakdown occurred.

It is sometimes maintained that only a single shot should be made with each filling of the test vessel. However, the tests indicate quite strongly that the contamination of the oil by the products of carbonization resulting from the first shot is negligible in its effect upon the accuracy of the results. Although it was deduced theoretically that it is most economical of time to take as many as fifteen shots on a single filling, it is probable that the danger of contaminating a single filling is appreciable and that a smaller number, such as the five shots, is more desirable. To investigate any possible effect of circulation of oil upon the observed dielectric strength, observations were carried out. From these it was concluded that the presence of a velocity as great as 1 m. per second does not appreciably affect the dielectric strength.

To determine the temperature coefficient a sample of each of the four grades of oil was tested for dielectric strength at average temperature of 45, 20, 10, 6 and 0 deg. C. Decreases in dielectric strength followed decreases in temperature at a reasonably constant rate, although the plotted curves were not smooth. The conclusion from the series of tests is that about 0.13 kv. per degree is a reasonable correction for deviation from 25 deg. C., the correction being subtracted when the temperature is above 25 deg. C. and added when the temperature is below 25 deg.

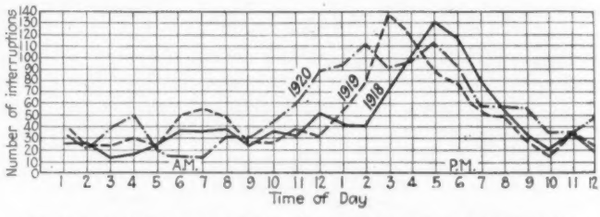
F. M. Farmer is chairman of the committee responsible for these tests.

Operation Helped by Curves Showing Time of Interruptions

IN ORDER to determine during what hours of the day the greatest vigilance of operators and troublemen must be exercised curves have been plotted showing the number of interruptions which occur each hour of the day on the system of the Georgia Railway & Power Company.

As will be seen in the accompanying drawings, these curves were plotted for the last three years, each curve showing the total number of interruptions in a year which occurred within a certain hour. These curves indicate clearly that during the time from 3 o'clock in the afternoon to 5 o'clock the interruptions are very much more frequent than at other times. Therefore, during these hours an attempt is made to increase the vigilance of all operators, dispatchers and repairmen.

The automobile trouble trucks are all held in reserve ready to answer any calls and the load dispatchers and operators are reinforced during the period of the day by extra men. If any equipment is out of service for repairs of a temporary nature an effort is made to get it back into operation by noon in order to anticipate the troublesome period occurring in the afternoon.



CURVES SHOW THAT GREATEST NUMBER OF INTERRUPTIONS OCCUR BETWEEN THE HOURS OF 3 AND 5 O'CLOCK IN THE AFTERNOON

The daily curve showing the total load carried by this company also has a peak at very nearly the same time that the interruptions are most frequent. This might be expected as at this time generating and distributing equipment is being loaded to its maximum and more equipment is in service. The fact, however, that a greater load is being carried at this time makes it all the more important that extra precautions should be taken to remove any trouble from the system as soon as possible.

G. A. ILER,
Superintendent of Operating Tests and Repairs.
Georgia Railway & Power Company,
Atlanta, Ga.

AVERAGE RATIOS OF BREAKDOWN VOLTAGES OF OIL IN VARIOUS GAPS

Electrode	Gap., In.	1-In. Disk				½-In. Disk				½-In. Spheres			
		0.05	0.10	0.15	0.20	0.05	0.10	0.15	0.20	0.05	0.10	0.15	0.20
1-in. Disk	0.05	1.00	2.10	2.76	3.36	1.46	2.62	3.24	3.79	1.91	3.45	4.12	4.39
	0.10	....	1.00	1.32	1.60	0.70	1.26	1.57	1.80	0.91	1.64	2.07	2.69
	0.15	....	....	1.00	1.22	0.54	0.96	1.19	1.37	0.66	1.24	1.58	1.96
	0.20	....	....	....	1.00	0.46	0.79	0.98	1.13	0.57	1.03	1.30	1.70
½-in. Disk	0.05	....	....	....	....	1.00	1.81	2.25	2.62	1.32	2.39	2.98	3.11
	0.10	....	....	....	....	....	1.00	1.24	1.44	0.73	1.32	1.63	1.83
	0.15	....	....	....	....	....	....	1.00	1.16	0.59	1.00	1.34	1.40
	0.20	....	....	....	....	....	....	....	1.00	0.51	0.91	1.16	1.38
½-in. Sphere	0.05	....	....	....	....	....	....	....	....	1.00	1.81	2.31	2.93
	0.10	....	....	....	....	....	....	....	....	....	1.00	1.29	1.61
	0.15	....	....	....	....	....	....	....	....	....	....	1.00	1.19
	0.20	....	....	....	....	....	....	....	....	....	....	....	1.00

Each entry in this table is the quotient obtained by dividing the breakdown voltage in the gap indicated at the top of the column by the breakdown voltage of the gap indicated at the left side of the table.

Design of Lighting Secondaries

THE following method of designing lighting secondaries is an attempt to put the necessary calculations on as definite a basis as possible, at the same time standardizing computations and eliminating time-consuming details. The first step is the determination of the kilowatt demand of each consumer. Each pole from which services are run is then treated as a sub-center of distribution. In calculating voltage drops the "kilowatt span" is taken as the unit of measurement. One kilowatt-span equals the number of kilowatts which may be transmitted over one span (or the number of spans over which one kilowatt may be transmitted) at 2 volts drop between neutral and outer wire. In Table I are given the sizes of wire required for different values

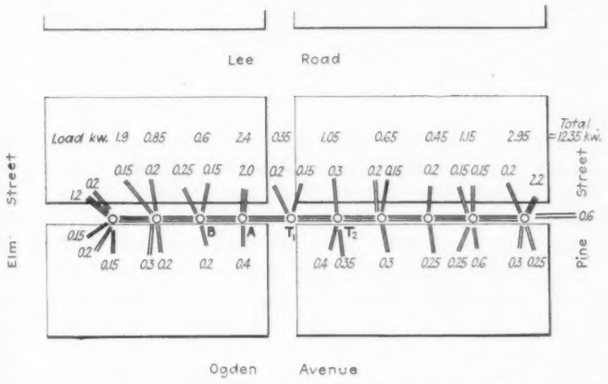


CHART TO CALCULATE SIZE OF WIRE FOR SECONDARY CIRCUIT FEEDING LIGHTING LOAD

Kilowatt spans are figured as below:

TRANSFORMER AT T_1

West			East		
Kw.	Spans	Kw.-Spans	Kw.	Spans	Kw.-Spans
1.9	× 4 =	7.6	1.05	× 1 =	1.05
0.85	× 3 =	2.55	0.65	× 2 =	1.30
0.6	× 2 =	1.2	0.45	× 3 =	1.35
2.4	× 1 =	2.4	1.15	× 4 =	4.60
			2.95	× 5 =	14.75
		13.75			23.05

TRANSFORMER AT T_2

West			East		
Kw.	Spans	Kw.-Spans	Kw.	Spans	Kw.-Spans
1.9	× 5 =	9.5	0.65	× 1 =	0.65
0.85	× 4 =	3.4	0.45	× 2 =	0.90
0.6	× 3 =	1.8	1.15	× 3 =	3.45
2.4	× 2 =	4.8	2.95	× 4 =	11.80
0.35	× 1 =	0.35			
		19.85			16.80

of kilowatt-span. For a drop of 1 volt the values in the kilowatt-span column should be reduced one-half.

In calculating residence loads a table similar to Table II may be computed, adjusting it as conditions warrant to the particular characteristics of a given community. This table shows the required transformer capacity for residences with different numbers of rooms. The demand figures do not represent the demand of the individual consumer at the service entrance, but rather the demand of the consumer at the transformer, taking into account all diversifying conditions. Where a considerable number of consumers are connected to a given secondary, this figure will, of course, be considerably below the demand at the individual consumer's service. For stores, shops and general commercial lighting an actual count of the connected load or a demand test will usually be required, as these loads are generally as incapable of standardizing as are residence loads. The demand of a store at the transformer will be from 10

TABLE I—SIZE OF WIRE FOR 110/220-VOLT SECONDARIES

Single-phase, 60-cycle, 98 per cent power factor, 12-in. spacing, 125-ft. spans, reactance included

Fine Wire, B. & S. Gage	Voltage Loss per Ampere per 1,000 Ft.	Voltage Loss per Ampere per Span of 125 Ft.	Voltage Loss per Kilowatt per Span of 125 Ft.	Kilowatt-Spans for 2 Volts Loss (Working Values)
6	0.821	0.1027	0.467	9
4	0.533	0.0667	0.303	13
2	0.351	0.043	0.200	20
1	0.287	0.0359	0.163	25
1/0	0.236	0.0295	0.134	30
2/0	0.195	0.0244	0.111	36
4/0	0.136	0.0171	0.0775	52

per cent to 30 per cent, or 40 per cent less than demand at the service, unless the transformer provided is but little larger than such demand. Likewise single-phase motors connected to lighting mains will show a very low diversity factor unless an individual motor constitutes a large proportion of the total load connected to a given secondary. If several motors are combined on one secondary with a considerable amount of lighting, they may often be virtually neglected as far as providing transformer capacity is concerned, particularly if their period of operation is largely off the lighting peak.

The accompanying drawing shows a typical survey of a lighting load. In the block shown alley distribution is employed and thirty-three services are fed from the secondary, there being twenty-nine residences, two stores, a sixteen-family apartment and one church. The total load is 12.35 kw., which requires a 15-kva. transformer as the nearest standard size. Preliminary inspection indicates that the transformer should be located at T_1. Accordingly the kilowatt-spans are calculated on both sides of T_1. The kilowatt-spans due to the load fed from any one pole equal the number of kilowatts at the pole multiplied by the number of spans from the pole to the transformer. For instance, the kilowatt-spans due to pole A equal the load at A (2.4 kw.) multiplied by the distance to T_1 (one span). This means 2.4 kilowatt-spans. Likewise due to pole B there are $0.6 \times 2 = 1.2$ kilowatt-spans. This is carried out for all poles west of T_1 and the sum equals 13.75 kilowatt-spans. Likewise the sum for all poles to the east of T_1 equals 23.05 kilowatt-spans. As considerably more of the load is west of T_1, a similar calculation is made taking T_2 as the transformer pole. This calculation shows that the kilowatt spans on the west of T_2 (19.85) very closely balance the kilowatt-spans on the east (16.8). Therefore T_2 is chosen for the transformer pole. Referring to Table I, it is found that with 19.85 kilo-

TABLE II—REQUIRED TRANSFORMER CAPACITY FOR RESIDENCES

No. of Rooms In Residence	Kilowatt Demand — Average Territory	Kilowatt Demand — High-Grade Territory
4 or less	0.15	....
5—6	0.20	0.25
7—8	0.25	0.30
9—10	0.30	0.40
11—12	0.40	0.50
Over 12	....	0.60

watt-spans No. 2 wire is required to keep the drop within 2 volts from neutral to outer wire. As the load may be well balanced on each side of the 110/220-volt line, a No. 4 wire may be strung for the neutral. Accordingly two No. 2 wires and one No. 4 will carry the load satisfactorily.

L. C. PETERMAN.

Brooklyn, N. Y.

Starting an Induction Motor Without a Compensator

A METHOD of connecting a motor so that it may be started under heavy load without the use of a compensator has been worked out by the writer. This is accomplished by arranging the motor for starting with part of the windings in a star connection and part in a delta connection. For instance, by reference to the accompanying drawing B (Fig. 1) it will be seen that one part or unit of each phase is in delta and two units are in star. In C two units are in delta and one unit is in star for each phase. Starting at A with the line voltage applied to the extremities of the connection, a certain torque will be developed and a certain current will flow in the winding. In B a greater torque will be developed and more current will flow. This will increase successively in C and D.

To test this scheme a 50-hp. motor was connected up with the different combinations. This was a six-pole, 1,200-r.p.m., 440-volt, three-phase motor. A potential of 176 volts was impressed upon the motor while the rotor was blocked by being clamped to a lever 40 in. long, one end of which rested upon a scale. Thus the torque of the motor was determined for the different connections. These values and the values of current drawn from the line are given in the accompanying table. This table also shows the theoretical values which should be obtained under these conditions. In the lower part of the table are also given the values which would be obtained with the different taps of a compensator if the motor were connected in delta. This table shows that connection C gave about the same torque as a 75 per cent tap on a compensator would give. The current in the star part of the winding was 74 amp. while the current with the compensator for the same torque would be only 58 amp. This shows that the heating of the motor would be greater with

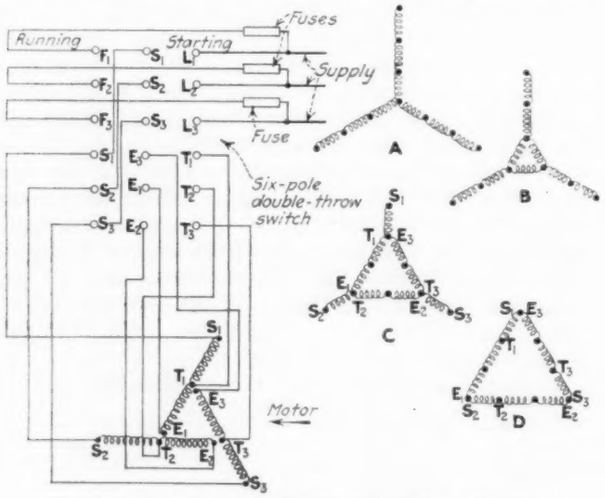


FIG. 1—MOTOR ARRANGED FOR STARTING WITHOUT A COMPENSATOR

the combination connection than with the compensator. However, the current in the delta portion of the combination winding would be only 43 amp., and as the delta winding embraces two-thirds of the coils in the motor this would allow the dissipation of a considerable amount of the heat into these coils, so that the heating would not be so great as indicated by the respective currents of 74 amp. and 58 amp. The B connection gave approximately the same torque as a 65 per cent compensator tap. In this case the current in the star part of the combination winding would be 57 amp., against 50 amp. if the motor started with a compensator. As before, the difference is lessened by the fact that one-third of the winding of the motor, the part connected in delta, carries only 33 amp.

The practical method of connecting this motor is as

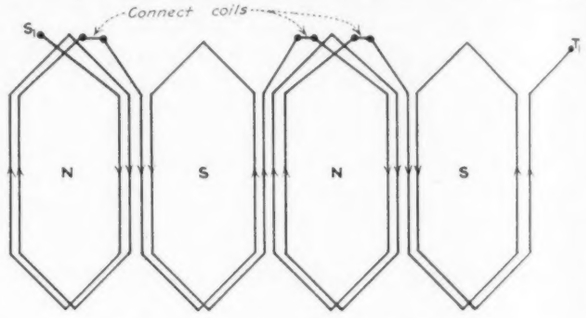


FIG. 2—COILS CONNECTED TO FORM "UNITS"

described in the following paragraphs. There were three coils per phase per pole in the motor. Instead of connecting these three coils under each pole in series directly, the first coil of the first phase under the first pole was connected in series with the first coil of the first phase under the second pole, and this was connected in series with the first coil of the first phase under the third pole, and so forth. On completion of this connection entirely around the motor one unit was formed of the six coils. The units are shown in the diagrams A, B, C, and D. As there were three coils per phase per pole, three of these units were formed for each of the phases, thus giving nine units.

This method of connection was accomplished in the motor by inserting the coils as shown in Fig. 2, putting in first a lap-wound coil and then a wave-wound coil, and connecting the ends of the coils as indicated. All three units of one phase are then connected in series, but taps are brought out to a junction board from the ends of all units.

It is seen that in using the combination winding several arrangements giving different starting torques and drawing different currents are available. However, for a certain motor drive only one combination is employed in addition to the delta or running combination. The combination is chosen which will start the load and still draw the lowest current from the line. This means that altogether nine leads must be brought out and connected to the starting switch. This should preferably be a double-throw, six-pole knife or drum switch. Six poles allow changing from unprotected line leads for starting to fused or otherwise protected line leads for running. In starting the motor with the switch it is thrown first to the starting position and then when the motor has come to speed it is changed over to the running position. Should it be desired to change the starting torque of the motor, this may be done by changing the leads from the junction box to the switch. This is similar to the operation in changing the taps in the compensator.

To understand the connections and the theory the same motor has been laid out in Fig. 3, each heavy line representing a coil. There are fifty-four coils, nine in each pole, and nine units with six coils in each unit. The position of the coils in the motor is shown at *M*. The connection of the coils is shown at *P*, where the units are marked. In this connection there are two

units in delta and one unit in star for each phase as at *C* (Fig. 1). The current in unit 1 is in phase with the line current and equal to it. For the sake of simplicity let it equal 1 amp. The current in unit 2 equals 0.58 times the current in unit 1 and is 150 deg. out of phase with the current in unit 1. Therefore the current in coil 2 is 150 deg. ahead of that in coil 1. However, this

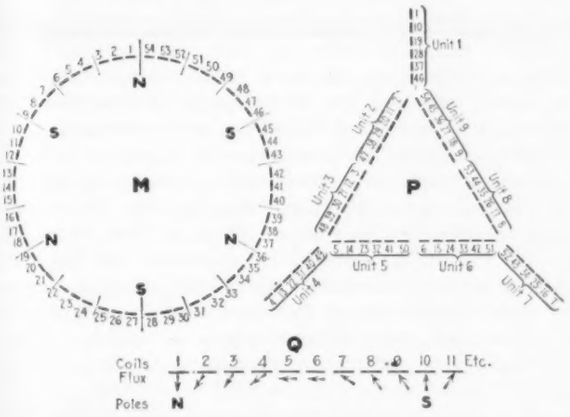


FIG. 3—EXPLANATION OF FLUX DIRECTIONS IN MOTOR STARTED WITHOUT COMPENSATOR

Six-pole, three-phase machine with fifty-four coils each represented by a short heavy line. *M* shows position of coils in machine. *P* shows sequence and arrangement of coils as they are connected with two units in delta and one in star per phase. *Q* is a development of the coils in their order of sequence in the motor. The short arrows represent magnetic flux.

coil is connected reversed with respect to coil 1 and therefore the magnetic flux is 30 deg. out of phase with the flux from coil 1. This flux relation is clearly illustrated at Q, which shows the coils developed in a straight line. The flux in coil 3 is equal and of the same direction as the flux in coil 2. By similar reasoning the flux in coil 4 is equal to that in coil 1, but is 30 deg. ahead of the flux in coils 2 and 3. The flux in succeeding coils progresses similarly 30 deg. at coil 7, 30 deg. at coil 8. When coil 10 is reached the current is in the same direction as that in coil 1, but the coil is connected in the reverse direction and consequently where

STARTING CONDITIONS OF MOTOR

Fig. No.	Test — No. Coils in Delta	Test — No. Coils in Star	Line, Volts	Line, Amp.	Amp. in Delta Part of Winding (Calculated)	Amp. in Star Part of Winding	Torque (Lb.-Ft.)
With combination winding (from tests):							
D	3	0	176	133	77	0	233
C	2	1	176	74	43	74	123
B	1	2	176	57	33	57	103
A	0	3	176	43	0	43	90
With combination winding (calculated):							
D	3	0	176	133	77	0	233
C	2	1	176	80	46	80	140
B	1	2	176	57	33	57	97
A	0	3	176	44	0	44	78

With compensator:

Straight Delta Connection with Compensator Tap of per Cent Indicated Below	Line, Volts	Line, Amp.	Amp. in Winding	Torque (Lb.-Ft.)
100	176	133	77	233
90	176	120	69	189
80	176	107	62	149
70	176	93	54	114
60	176	80	46	84
50	176	67	39	58

there was a north pole under coil 1 there is a south pole under coil 10. The flux has changed direction 30 deg. at a time from positive to negative. If this reasoning were carried out for all the coils, it would be seen that the motor had six poles changing in proper order and position as a trip is made around the motor.

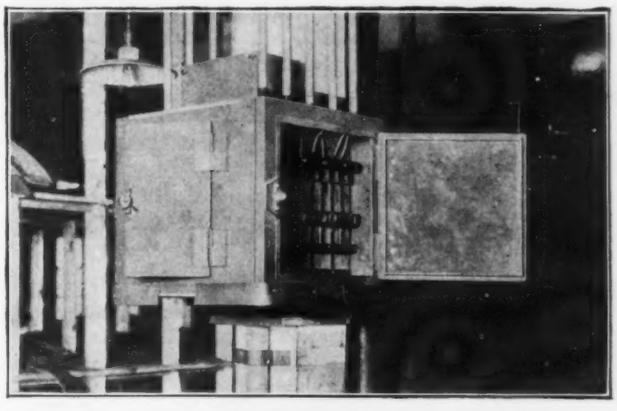
The foregoing explains the connections for a motor having six poles and three coils per phase per pole. A similar connection might be worked out for any other motor which has more than one coil per phase per pole.

United Zinc Smelting Corp., Moundsville, W. Va. J. W. MURRY, Electrical Engineer.

Switch Cabinet Made in Plant Occupies Little Space

A CONVENIENT home-made switch cabinet for low-voltage service in factory lighting and small power is employed at the plant of the Graton & Knight Manufacturing Company in Worcester, Mass. As illustrated, the cabinet consists of a set of two slate distributing panels mounted on opposite sides of a column, with a main switch mounted on cleats on the intermediate face of the post and the whole inclosed by a cast-iron and galvanized-iron housing with hinged doors. The doors are fastened by sash locks. The conduit carrying the feed wires to the main switch is set in the channel formed between the cleats. The distributing panels mounted on the other two faces are carried out beyond the post to form slate barriers at the side of the main switch, and the buses are run across the distributing panels to within 1 in. of the edge. Connecting studs passing through the busbars and slate permit connection to the main switch busbar on the back of the panels, which are made reversible by terminating the buses equidistant from the edge. Angles 1½ in. x 1½ in. x $\frac{3}{16}$ in. are used in attaching the panels to the post, and this makes the construction sufficiently rugged to withstand the rough usage to which cabinets are liable when set at the side of a passageway where trucking is done. Leather strips ⅛ in. thick have been riveted on the corners to avoid injury to passers-by.

The advantages of this construction, apart from minimizing the investment cost, are the radial central



SWITCH CABINET MADE TO FIT AROUND THREE SIDES OF BUILDING COLUMN

distribution, occupying a minimum of space and permitting higher mounting because all switches are in the same horizontal plane, and the convenient access to all connections. Unless the panels are so constructed that no live parts are exposed, this construction is adapted only to low-voltage service. The cost of such a cabinet is not over $2 per kilowatt of capacity.

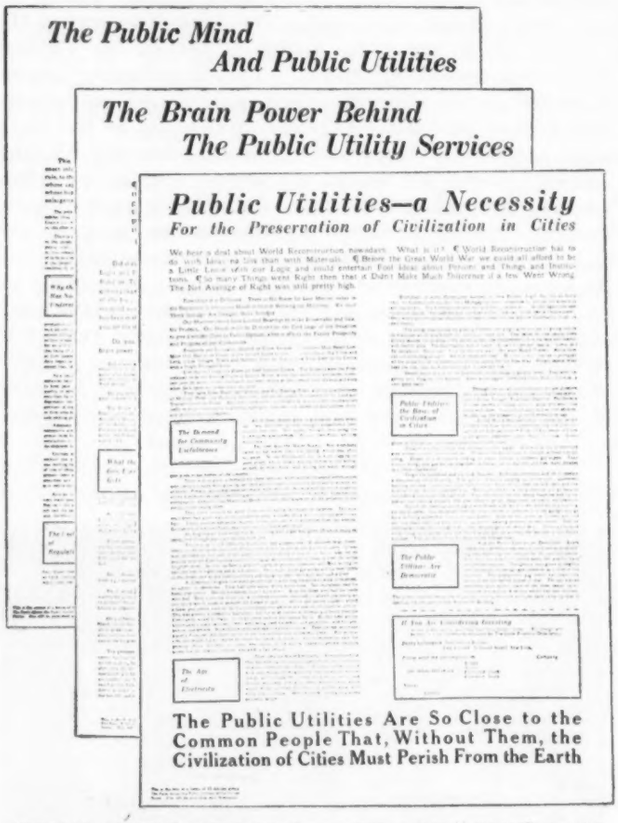
Graton & Knight Mfg. Co., Worcester, Mass. A. H. MAGNUSON, Electrical Engineer.

Management and Policy

Embracing Central Station Commercial Organization and Management, Customer and Trade Relationships, Public and Financial Policies, Advertising, Selling and Service Methods

Utilities Underwrite Clever Essays on Public Service Subjects

FULL-PAGE articles on the value of the public utility to the community are now appearing weekly in the New York *Globe* as the result of the enterprise of Darby Richardson of the *Globe's* financial staff. Mr. Richardson believes that there is a healthy growing interest on the part of the investing public in utility securities, but that most persons have a very small appreciation


The Public Mind
And Public Utilities
The Brain Power Behind
The Public Utility Services
Public Utilities—a Necessity
For the Preservation of Civilization in Cities
The Public Utilities Are So Close to the Common People That, Without Them, the Civilization of Cities Must Perish From the Earth

TYPICAL ARTICLES APPEARING IN NEW YORK "GLOBE" SERIES

of the importance of the public service corporation in modern life and the scale on which their business has developed. He discussed the matter with a number of the larger central-station companies of the country and secured their co-operation in the underwriting of a series of twenty-five advertisements, which are really simple, forceful, interesting essays on the different human aspects of the public utility. These articles are now appearing each Wednesday with such titles as:

"The Brain Power Behind the Public Utility Service."
"The Average Person's View of the Electric Utilities."
"The Holding Company's Place in Public Utilities."
"Continuous Incomes for Public Utilities."
"The Romance of Electricity."
"The Dangers from M. O. to Public Utility Investments."

Each advertisement bears a return coupon by which the reader may ask the *Globe* financial department for information in regard to utility investments.

The publication of this series of essays is telling an invaluable story to a very large number of homes in the New York metropolitan district, but the effect is being extended still further through the distribution of reprints of the articles by a number of the underwriting utility interests, which are sending them to the local customers of the central-station companies. One company, for instance, plans to send a pamphlet containing the complete series to all the school teachers in one Western state, with the suggestion that it be used as the subject for an essay competition in the schools. In other cities the utilities purpose to interest the local bankers in co-operatively publishing these articles in the local press when the series is complete, for the benefit of the investing public. Each article before publication is being submitted to M. H. Aylesworth, executive manager of the National Electric Light Association, and receives his official approval.

A Traffic Count for the Information of Neighbors

VERY few of the neighbors of the electric light and power company in a city realize how great an influence the central-station office and salesroom exercises in attracting people to the neighborhood. To reduce this to approximate figures that might be brought to the attention of the surrounding merchants, J. E. Davidson, vice-president and general manager, had a tally kept over a recent twelve-month period of the number of persons who visited the office of the Nebraska Power Company in Omaha. On the completion of the count Mr. Davidson wrote this letter to fifteen retail merchants:

DEAR NEIGHBOR: Some of the neighbors of the Nebraska Power Company told us when we moved into the Electric Building that they were glad to have us as neighbors as they thought we would bring more people into this part of the city.

In our effort to better public relations we have kept close tab on transactions with customers whether in payment of bills, repairs, purchase of merchandise or adjustments, etc. For that reason it is very easy for us to segregate these records into almost any proposition that we desire.

You will probably be interested in reading some of the figures as to the number of people who have come to our electric shop to pay bills only. I say only, because it does not include those who enter the shop to purchase merchandise, apply for service adjustments, etc. The smallest month's record was 13,843; the largest month's record was 21,791; the monthly average was 18,590, and the daily average was 715. Adding 30 per cent for sale of appliances and repairs would make a monthly average of 24,167, or a daily average of 930. Yours for more business, J. E. DAVIDSON.

The neighboring merchants were extremely pleased both with the concrete evidence of the increased sidewalk traffic which is now passing their windows on its

way to the electric light office and also with the friendly spirit of the company. It was an act of courtesy that brought forth many expressions of appreciation and good will.

A Prepayment Meter to Collect Overdue Accounts

A METHOD of utilizing a prepayment meter to collect overdue accounts was shown at the New London convention of the New England Division, N. E. L. A., recently when the practice of the Union Light & Power Company, Franklin, Mass., was described. There have been several cases where for worthy reasons, such as sickness or non-employment of a customer who has in the past paid his account promptly, an account has run several months and finally reached an impasse. To meet this situation the company has used the prepayment meter, installed on the customer's premises and using the 25-cent gear. This means that for every 25 cents deposited the customer pays 14 cents each for the immediate kilowatt-hours used, and his back account is credited with the balance of 11 cents per kilowatt-hour. In this way the company has been able to close several accounts and retain the good will of the customer.

The prepayment meter is allowed to remain until a credit balance of $5 is shown on the customer's account, this being used as a deposit. A receipt is sent the customer and the prepayment meter is then replaced by one of the ordinary integrating type.

"7.37 per Cent" Makes Effective Feature of Securities Advertisements

EXPERIENCE has shown that an advertising program can be made doubly effective if it is centered around some one particular feature. In Evansville, Ind., the Southern Indiana Gas & Electric Company has done this very effectively by making an attractive design of the figures "7.37%," representing the rate of return on an investment in the company's preferred stock. The "7.37%" is prominently displayed in all advertisements, one of which is shown here. Another use made of the idea is a large red poster about 18 in. by 36 in. with "7.37%" in white figures. This is displayed in conspicuous places in the company's offices, on the fronts of street cars, on the company's trucks and wherever it will catch a prospective stockholder's eye. H. T. Sharpe, contract agent in charge of the sale, states that the advertising is producing highly satisfactory results.

7.37%
Make These Sockets Earn You Money
An Evansville Bank
Investment in a Staple Product Means Security
Southern Indiana Gas & Electric Company

FULL-PAGE ADVERTISEMENT FEATURES RATE OF RETURN

What Other Companies Are Doing

Northern Illinois.—An exemplification of the benefit that accrues to electrical contractor-dealers from sales campaigns of central-station companies is shown in the sales of electric ranges in the territory of the Public Service Company of Northern Illinois. During the first six months of this year the company's range sales have exceeded by 20 per cent the sales for the entire year of 1920. New connections of ranges for the same period have exceeded by 30 per cent the connections during the whole of last year. The increase in connections is due to contractor-dealer sales. It is believed that the contractor-dealers would not have sold 5 per cent of the ranges they did had it not been for the Public Service Company's educational and promotion work on these appliances.

Portland, Ore.—To stimulate the collection of delinquent accounts by its branch offices the Pacific Power & Light Company publishes each month in its *"Bulletin"* a chart showing the relative standing of the branches. By comparing the delinquent accounts to gross earnings the percentage of delinquency is ascertained and the branch offices thus rated. Keen rivalry among the eighteen branches has materially lowered the percentage of total outstanding accounts. W. A. Dunlap, statistician of the company, brings the chart up to date each month and calls attention to any change in standing of the different branch offices. For the past six months the best showing has been made by the White Salmon branch, which gained 26 points, followed by the Sunnyside branch, which made a gain of 18 points.

Chicago, Ill.—A new booklet entitled "Income Building on the Byllesby Ten-Payment Plan" has just been issued by H. M. Byllesby & Company. The booklet describes the company's partial payment plan for purchasing securities, and illustrates with tables and compilations in detail how the plan works. An interesting feature is a comparison of the rate of growth of money when compounded at various interest rates. Another is a graphic chart showing how the regular monthly saving of certain sums grows over a period of twenty-five years. A number of Byllesby securities are illustrated and described, and five booklets dealing with various phases of the company's operations, securities, etc., which are offered for distribution are illustrated. A copy of the new "Ten-Payment Plan" booklet will be sent to inquirers upon request.

Minneapolis, Minn.—The month of August in the Minneapolis General Electric Company was the busiest August ever experienced by the company and one of the busiest months in the company's history. The net gain in customers was 15 per cent greater than any other August, all classes of business showing good gains. In spite of power disconnections due to the shutting down or partial shutting down of industrial plants, a net gain of 852¾ hp. connected was shown for the month. Four hundred and ninety-two old houses were wired as compared with 479 for the same month last year. An idea of the volume of business transacted in the Minneapolis office may be gained from the fact that 3,288 contracts of various kinds were signed during the month as compared with 2,536 contracts during the same month the previous year.

Digest of Electrical Literature

Including Brief Abstracts of and References to Important Articles Appearing in the Scientific and Engineering Press of the World

Generators, Motors and Transformers

Small Rotary Rectifier. — R. BARTHÉLEMY. — The article gives a detailed description of a rectifier of 60 watts to 80 watts direct-current output for charging of storage batteries of 6 volts to 24 volts. A synchronous motor with a Siemens double-T armature and a simple commutator, turning on ball bearings within a stationary field of either a permanent magnet or a magnet excited by the battery, is used. The motor is started by hand with a self-disengaging gear. The rotor consumes only 10 watts.—*Revue Générale de l'Electricité,* Sept. 10, 1921.

Balancing High-Speed Electric Machines.—H. H. WHEELER.—The article indicates several of the main causes of vibration in turbo-generators and similar machines and tells of methods employed to overcome it. This article describes methods of getting the static balance and also the centrifugal-force method for eliminating vibration at various speeds. Mention is also made of running machinery above "critical speeds." At speeds very much greater than the critical rotation becomes remarkably steady, and many machines have been designed to take advantage of this. Such a course is, however, hardly to be recommended for dynamos and motors ordinarily since the composite nature of their construction renders them liable to sustain serious strains while being run up to speed or being stopped.—London *Electrician,* July 29, 1921.

Lamps and Lighting

The Theory of the Beck Arc.—H. BECK.—The author gives an account of his theoretical investigations of very high-current arc phenomena such as occur in the Beck searchlamp. The character of the negative flame and the positive crater are studied both for slow and for fast vaporizing carbons. The question of pressure and vapor density is investigated, and an explanation is given for the deep crater formation. The much advertised Sperry high-intensity arc, the author claims, is an imitation of the antecedent Beck arc.—*Elektrotechnische Zeitschrift,* Sept. 8, 1921.

Types of Circuits Employed in Street Lighting.—C. H. SHEPHERD.—A description of multiple and series circuits, with a number of intermediate combinations which are utilized for street-lighting purposes. The group system is favored as it combines many important advantages of other systems. A number of systems are described and distribution and control equipment is discussed.—*Electrical Review,* Sept 10, 1921.

Generation, Transmission and Distribution

Manufacture and Testing of High-Tension Porcelain Insulators.—A. D. ALLEN.—A practical description of the processes involved in making and the care essential in inspecting high-tension insulators. The materials are described and classified and the methods of working the material, making the molds, forming the porcelain and baking are described. Some of the defects which may be detected in inspecting are also mentioned.—*Electrical News,* Aug. 15, 1921.

Latticed Steel Poles for High-Tension Transmission. CARLO FASCETTI.—Calculations and formulas giving the weight of a steel pole in function of the span and size of conductors are given in this article. The portion of the tower set in the concrete and also the weight of the cross-arm are considered as constant, not being affected by the size of the conductors or the length of the span. Hence the weight of the pole depends on the degree of the wind pressure against the exposed area of the pole and of the line conductors and also on the height above the ground of the lowest wire. With reference to the transmission voltage the author shows that the increased distance between the wires does not materially change the height of the pole and does not affect the use of the formulas. Tabulated data and practical examples are given showing the application of the formulas.—*Elettrotecnica,* Aug. 5, 1921.

Practical Results of Higher Power Factor by the Use of Static Condensers.—CORRADO LANDI.—Among the various methods adopted to improve power factor the static condenser has come into use very recently. Heretofore it was found difficult to obtain for this purpose an apparatus convenient, durable and economical. The most recent type of static condenser, which embodies many valuable features, uses impregnated paper as a dielectric, the same as that used in submarine cable, thus permitting a compact structure of small dimensions and weight. Condensers rated up to 100 mf. are connected without special precaution, while those of larger capacity have a starting rheostat connected in series in order to reduce to a minimum the transients produced by switching. The author gives a tabulation of sizes and weights for condensers of different capacity; also tables of results obtained from tests on motors with and without condensers at no load and at 40 per cent load.—*Elettrotecnica.* Aug. 5, 1921.

Traction

New Electric Passenger Locomotives for the Silesian Mountains. — LOEWENTRAUT. — The Silesian Mountain railways present some of the most difficult traction problems in Europe. Steep and long grades, numerous small curves and a traffic system which imposes both passenger and freight service on the same locomotive are the handicaps. Fourteen "2-D-1" locomotives were ordered at the Bergmann works, to operate on 15,000 volt, single-phase alternating current at 16⅔ cycles and capable of pulling from 500-ton to 1,200-ton trains at top speeds of 90 km. to 55 km. per hour respectively. In 1917 the first of these engines was put in service on the line from Lauban to Königszelt, and it has given very good results. One motor only is used, transmitting its power by means of two 45-deg. inclined rods upon two jackshafts, from which the four drivers

are actuated by horizontal coupling rods. The motor has an hour rating of 3,000 hp. and is said to be the largest railway motor in the world. The diameter of the motor is so large that the upper part of it extends through the roof of the engine. The complete locomotives weigh 108 tons and develop at the start a pull of 20,000 kg. at the circumference of the drivers. *Elektrische Kraftbetriebe und Bahnen*, Sept. 10, 1921.

Electrophysics and Magnetism

X-Ray Bulb with Liquid-Mercury Anticathode.—ALEX MÜLLER.—Experiments by the writer showed that it was easy to get fairly hard and intense X-rays using directly a liquid-mercury anticathode, a fact which led to the possibility of obtaining the X-ray spectrum of mercury. The experiments proved the fact that materials with fairly high vapor pressure can be used as anticathodes for X-rays.—*Philosophical Magazine*, September, 1921.

Variation of Resistance of Selenium with Temperature.—SNEHAMOY DATTA.—Though the light sensitiveness of selenium has been studied by a large number of workers, its heat sensitiveness has not been studied thoroughly, and it was therefore thought worth while to make tests with a view to decide how far the properties of selenium are attributable to changes caused by temperature variations. It was found that the resistance decreases with temperature according to the equation $R_t = (65.01 - 0.86t + 0.0029t^2)10^{\circ}$.—*Philosophical Magazine*, September, 1921.

Electrochemistry and Batteries

Influence of Electric Furnace on Metallurgy of Non-Ferrous Metals.—H. M. ST. JOHN.—As a result of its mechanical semi-automatic nature, electric melting, this paper states, is gradually doing away with the secretiveness which has characterized the non-ferrous industries and is replacing the experienced brass melter by a mechanic who needs only to understand his machine and its capabilities. By its use of large melting units, with closed chambers virtually free from oxygen and products of combustion, electric welding has revolutionized metal-handling methods and produces a more uniformly high quality of product, with less labor and less metal wastage, than have previously been possible. —Paper read before American Electrochemical Society, Sept. 29, 1921.

Units, Measurements and Instruments

A New Electric Hygrometer for Remote Indication.—J. CARTUS.—Knowledge of the degree of humidity of the air existing at any time is of great importance in cotton mills, refrigerating plants, breweries, storage rooms for tobacco, grain, paper, etc. The dry-and-wet-bulb thermometer method (psychrometer) has been used generally for these purposes. Hartmann & Braun have put on the market a new instrument which permits of the direct reading or permanent registering, in percentages of humidity at any distance from the room under control. Instead of a wet and a dry thermometer a very sensitive battery of thermocouples is used, one end of which is kept wet by a small wick of muslin hanging from a cup of distilled water. The ends of the couples lead to a millivoltmeter graduated directly in hundreds. To offset the influence of the varying room temperature a small mercury thermometer is installed next to the hygrometer. This has several platinum wires fused into the capillary tube and connected to the steps of a shunt to the millivoltmeter, so as to change its reading characteristics according to the changing room temperature.—*Zeitschrift des Vereines Deutscher Ingenieure*, July 16, 1921.

Apparatus for Measuring Ground Resistance—M. LESSALLE.—It is customary to measure the ohmic resistance of a ground connection by the Kohlrausch method bridge, using a small induction coil, a net of calibrated resistance units, a slide wire and a telephone. Three measurements must be made and three equations must be solved to obtain the desired result. The author has devised and patented a modified method whereby the bridge connections are made so that the slide wire is not calibrated, as is usual, according to its two parts, a/b, but according to $1 + (a/b)$. This reduces the method to only two measurements and the solution of only one or sometimes two equations.—*Revue Générale de l'Electricité*, Sept. 10, 1921.

Telegraphy, Telephony and Signals

Piloting Vessels by Electrically Energized Cables.—A. CROSSLEY.—This problem has been apparently met with the aural receiving equipment, but there is a demand for some kind of a visual device which will indicate directly the location of the cable. Work on such a device is now being undertaken by the New York Navy Yard. Arrangements have been considered by the International Communication Conference, meeting at Washington, whereby this aid to navigation will be internationalized and adopted by all countries having seaports. The New York Harbor installation will not cost more than $50,000, which is about equal to the cost of beacons and buoys now used in and about New York Harbor. Figuring the cost of receiving equipment for the audio piloting cable system at approximately $1,000 per vessel, it can be seen that the equipment will pay for itself within a period of a few hours, when steamships are detained outside of harbors at a cost of $500 to $4,000 per hour. The article contains a summary of historical developments.—*Proceedings Institute of Radio Engineers*, August, 1921.

A New Direction Finder.—G. M. WRIGHT AND S. B. SMITH.—A description of a new method of finding direction developed by the engineers of the Marconi company. The advantage claimed for this new method is that it is less seriously affected by the reflection and refraction phenomena which are usually known as night effect. The system consists of the well-known combination of the Bellini-Tosi aerial and an open aerial adjusted to give a heart-shaped diagram with a single zero. It is indicated that a receiver of this type may give very inaccurate results, but if the signals are so strong that the minimum is sharply defined there should be no difficulty.—*Radio Review*, August, 1921.

Miscellaneous

Small and Inexpensive Arc Furnace.—E. F. RUSS.—A very simple and cheap electric furnace of 500 kg. capacity with one or two electrodes suitable to be connected to any single or three-phase alternating-current power supply is described. An oil-cooled reactance coil in series with the furnace prevents short-circuiting when the arc is formed. The electrodes are advanced by hand operation. The energy consumption for one charge of 500 kg. is given to 550 kw.-hr. The furnace has been designed and is especially suitable for machine shops which produce their own small steel castings.—*Elektrotechnische Zeitschrift*, Sept. 8, 1921.

News of the Industry

Chronicle of Important Events and General Activities in the Technical, Commercial and Manufacturing Fields With Announcements and Reports of Association Meetings and Conventions

Bankers Told Prosperity Cannot Be Halted

OPENING the annual convention of the American Bankers' Association, held in Los Angeles this week, John S. Drum, president of the association, declared that there is nothing in the domestic situation or in the international situation that can sustain a pessimistic outlook. Gradually, he said, influences preventing the restoration of stable conditions are disappearing as prices move toward stability on an equitable basis.

"The full purchasing power that is a necessary prerequisite of normal prosperity is being recovered steadily," he continued, "as social and political conditions abroad improve. The wealth wasted in war is being replaced, and foreign countries are working to rebuild the productive capacity that measures their ability to consume, and as foreign production increases world markets for American goods are being reopened. It is true that many problems, both domestic and foreign, are standing in the way of a restoration of stable conditions and normal domestic and world prosperity, but the forces that are working to solve these problems are irresistible."

Georgia Line Construction Regulation Law Fails to Pass

THE bill before the Georgia Legislature that aimed at the establishment of regulations by the Railroad Commission to govern overhead-line construction failed of passage in the House after being amended in the Senate. It was returned to the House too late for consideration. The bill as finally amended limited the scope of the rules to protection from physical hazards, though originally it was drawn to include inductive interference. Another amendment exempted from the provisions of the proposed law all utilities municipally owned. If the bill comes up for consideration next year, it will be necessary for both houses to pass it.

Chicago Building Trades Council Approves Landis Award

AFTER Judge Landis had declared himself "up in the air" and ordered a two weeks' continuance of the Chicago building controversy to "let things simmer down," the Chicago Building Trades Council on Friday night of last week expelled the hoisting engineers, who were the only defiant union organization remaining, and unanimously accepted the wage award made by Judge Landis about a month ago. The action came suddenly, after the situation had apparently reached a deadlock with little prospect of immediate progress in any direction. The approval of the council included that of the carpenters, who have been the principal disturbing element in the situation, they having refused to bind themselves at any time to take part in the proceedings under the direction of Judge Landis. The action of the council opens the way to the rehearings demanded by some of the trades that are dissatisfied with the wages awarded them. In some cases this will result in taking up again the matter of elimination of working rules that were the reason for a smaller wage being awarded than the trades in question would have otherwise received.

America Must Participate in European Restoration, Investigators Say

CONVICTION that the United States cannot refrain from active participation in the settlement of the economic and financial difficulties confronting the world is expressed by a special committee of the Chamber of Commerce of the United States just back from an extended trip through European countries where government officials and business leaders were interviewed and where in a close study on the ground the committee sought the views of various elements of the population. In a report to the board of directors of the Chamber of Commerce the committee declares:

"In every country visited the opinion was expressed that neither western nor central Europe can be restored to a condition which promises hope and progress for the future without our assistance. Every country desires our friendship and assistance, and it is apparent that we can participate in the restoration of commercial and industrial productivity on any reasonable and consistent terms, either by modification of the Versailles treaty to meet the policies of the United States or independently of it."

Westinghouse Receives $7,000,000 Railway Contract from Chile

THE Westinghouse Electric International Company announces that it has received final confirmation of the contract to supply the equipment to electrify the Chilean State Railroad between Valparaiso and Santiago and the Los Andes branch. This contract covers the largest railway electrification undertaken by an American firm outside of the United States.

The main line, which is 116 miles long, is now under steam operation and is the most important railway line in Chile. It connects the leading seaport (Valparaiso) with the capital (Santiago), while the line to Los Andes is 28 miles long and forms the Chilean State Railway section of the transcontinental line to Buenos Aires.

The contract, which has a total value of $7,000,000, was obtained despite keen competition from Germany and other European companies. The award was given to the American firm because of its more complete and

correct engineering analysis of the situation as well as its low price.

The equipment to be furnished consists of eleven local passenger locomotives, fifteen road freight locomotives, six express locomotives, seven switching engines and five substations of 4,000 kw. rating each. All of these locomotives are to be of Baldwin-Westinghouse manufacture. The 3,000-volt direct-current system which will be used will be strictly American in character. The capacity of this equipment will be 50 per cent greater than present traffic demands, and the plans have been so drawn that an increase of traffic capacity reaching three times the present demands can readily be obtained.

This contract represents the third large order for electric railway supplies received by the Westinghouse Electric International Company from a foreign country in the past few months, the others being obtained from France and Japan. The Errazuriz-Simpson Company of Chile will build the overhead construction.

Portland Company to Finance Project with Preferred Stock

IN ORDER to provide capital for extensions and betterments, but primarily to finance the construction of a large hydro-electric project, the Portland (Ore.) Railway, Light & Power Company has authorized the sale of $10,000,000 of 7 per cent prior preferred stock, to be sold as needed. Much preliminary work has already been done on the Oak Grove project, which is capable of an ultimate development of 60,000 kw., and actual work will be started on the first unit of 20,000 kw. within the next year if adequate financing can be had. It is estimated that it will take three years to complete the first unit. Additional units will be added as required.

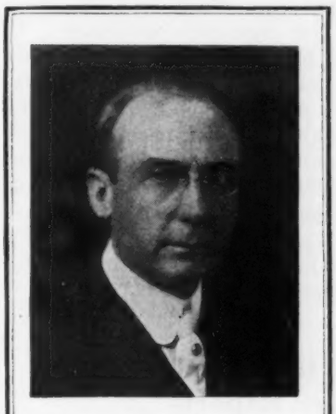
Prior to placing the stock on the market a financial reorganization of the company is being arranged. Supplementary articles of incorporation have been filed increasing the capitalization of the company from $35,000,000 to $42,500,000. A reduction of $5,000,000 is to be made in the common stock of the company. There will be issued $2,500,000 of first preferred stock that will not be offered for sale. There has been issued and paid in full $22,500,000 of the company's stock. Holders of the new $10,000,000 of prior-preferred stock will be first to receive dividends. As far as possible the same policy will govern the company in disposing of this new issue of stock as was followed recently when $1,000,000 of 8 per cent gold notes was offered locally.

Washington Contractor-Dealers Withdraw from National Association

DECISION was reached at the annual convention of the Washington Association of Electrical Contractor-Dealers, held in Yakima, Wash., Sept. 16, to follow the action of the California and Oregon state associations in withdrawing from the National Association of Electrical Contractors and Dealers. Similar action was taken at the Oregon state convention held June 12 and 13 at Eugene and at the California annual meeting held at Berkeley Aug. 27. A joint letter to the national association giving notice of withdrawal of the California, Oregon and Washington state divisions was signed by the presidents of the three associations at the Yakima meeting.

Business Good in Southern California, Says S. M. Kennedy

BUSINESS in southern California is in a much better condition than it is in the East, according to S. M. Kennedy, vice-president Southern California Edison Company, largely because there was not the same extreme inflation and consequently there is not the necessity for deflation. Mr. Kennedy, who is a well known authority on public relations and central-station business building, while in New York recently on a business trip was asked by the ELECTRICAL WORLD to outline the conditions in the great territory served by his company, and he started out with a remark that undoubtedly has a much wider application than just to southern California.



S. M. KENNEDY

"Whatever depression has been felt in southern California," he said, "has been more sympathetic than anything else. We are a part of the nation and as such cannot escape altogether economic disturbances that are so widespread. Business with us, however, is really good and we are going ahead vigorously.

"In every town in southern California homes are being erected as fast as they can be built. There is a scarcity of homes, and now that building costs and labor's wages have decreased people are building. In fact, one of the greatest difficulties before the Southern California Edison Company today is to keep pace with the demand for service to new buildings, most of which are dwellings.

"Industrially and agriculturally we are operating at about the same level as a year ago. We are serving more irrigation stations and as many industrial plants, but the load of the latter is not quite so large as it was, say, twelve months ago.

"Gross revenue has been increasing satisfactorily month by month during the year in spite of an appreciable reduction in rates. The increase in business, in other words, more than offsets the lower rates.

"Labor seems more satisfied than at any time in the previous twelve months. Our company is not cutting salaries or wages of existing employees, but starting with last July the new employees for line and construction work have been taken on at a lower scale of wages. This seems to work out very well, and the new men seem well satisfied.

"In the oil fields of southern California, where about 10,000 men are employed, wages were reduced all along the line one dollar a day. While these men are now out on a strike, it is not a question of wages but rather one of recognition of the union.

"In certain classes of agricultural production conditions are somewhat unsatisfactory, but they are improving. During and immediately following the war fancy prices were obtained for many products. This incited the farmers to overproduction, and then came a poor market. This overproduction, which was stocked, has

now been absorbed and the new product is being sold again at a favorable price. The same is true of the canning industry. There is now a decided improvement, and conditions are more hopeful than prevailed six months ago.

"These improved conditions are naturally being reflected in our sales of company securities locally. During the current year our company has sold more than $10,000,000 of stock to customers, and the total number of stockholders to date is 21,000. Our sales of stock locally are being made by a regular and permanent department that is operating every day and creating a steady demand for the company's securities. It is not only increasing the number of stockholders but is obtaining heavier investments from old stockholders.

"One of the big features of the company's stock-selling program is that two-thirds of our permanent employees are stockholders and the percentage is steadily increasing. We now have 3,000 employee stockholders. The customer-partnership plan is the ideal public ownership, and the Southern California Edison Company's eventual number of stockholders is limited only by the number of its customers."

A. R. A. Inductive-Interference Committee Reports

AT A SESSION of the telegraph and telephone section of the American Railway Association held in Cleveland week before last the inductive-interference committee submitted a report in which the theory of inductive interference was discussed and a description of its causes and effects included. The report was accepted for submission by letter ballot for inclusion in the A. R. A. manual. The description of causes and effects is confined to the "detrimental inductive effect on telegraph and telephone circuits caused by adjacent power circuits or systems." Inductive interference between telegraph and telephone circuits is mentioned, the remedy, it is said, consisting in transpositions in accordance with schemes worked out by the committee on maintenance of outside plant to reduce the effects of such interference. Three classes of interference are dealt with—interference with operation, which includes interruption of service; interference with telegraph communication, and interference with telephone signals. The classifications cover physical injury to plant from fire, damage to apparatus or protective apparatus and hazard to employees from electric or acoustic shock.

The report contains a fairly full discussion of the factors in the power circuits tending to create inductive interference, but aside from lack of balance in the communication circuits and those factors due to poor construction or maintenance no attention is given to the characteristics of communication circuits that render them unduly susceptible to the influence of paralleling power circuits. Except for the incidental mention of transpositions, there is no discussion of preventive or remedial measures.

A supplemental report contains the statement that the committee has learned through inquiry from the various state commissions that the subject of inductive interference is very much alive. A list of ten states in which rules have already been adopted or adoption of such rules is contemplated is given. Constant reference is made to California General Order No. 52 in this connection. This is the order by which the final recommendations of the California committee were put in force in that state. The American Railway Association through its secretary has been instrumental in furnishing copies of the order to the railroad and public service commissions of forty-three states.

It is interesting to note that in the make-up of the committee, in addition to the railroad representatives, the names of L. P. Ferris and R. W. Mastick, of the American Telephone & Telegraph Company and the Pacific Telephone & Telegraph Company respectively, appear. Both men were employed in the California inductive-interference study. One manufacturer's representative appears, but there is no direct representation of the power interests.

Indiana Association Considers Overhead Crossing Situation

ALTHOUGH the program of the thirteenth annual meeting of the Indiana Electric Light Association at French Lick Springs which was held recently was curtailed because of the consolidation of the meeting of the association with the meeting of the Great Lakes Geographic Section, N. E. L. A., the session was an interesting one. President DellPlain's address, delivered at the banquet on Friday night, called upon the members to center their thought on the improvement of the domestic life of their communities, to create good will by every possible means, and especially not to overlook the value of employees as a medium to this end. The establishment of a sound and active sales policy both as to product and merchandise was called for, and the members were especially warned against the hasty reduction of wages, Mr. DellPlain advocating a policy of non-interference with the present staffs and the limiting of adjustments, if any, to the newcomers.

The overhead-crossings committee reported that the law in Indiana was such that modern practice was difficult to adopt, because when the law was adopted a number of years ago the practices then current had been written into it. A committee was appointed to consider the drafting of new legislation that can be presented to the next Legislature to relieve the situation and permit the elimination of undesirable practices.

The discussion of the educational committee report centered around the meter course carried on at Purdue University and developed a strong sentiment for similar courses on overhead-line and distribution practice.

W. L. Goodwin, assistant to the president of the Society for Electrical Development, declared that electricity was not a necessity but a convenience and that the business should be developed on this basis. The difference indicated between the two is that profits must be lower on the necessities and the degree of control greater than on the conveniences.

No industry spends so little for aggressive and defensive work as the central-station company. This was the message that M. H. Aylesworth, executive manager of the N. E. L. A., left with the meeting in discussing the work of the national association. F. A. Bryan of South Bend made a heart-to-heart plea for a personal examination on the part of all the members to determine what may be wrong with their methods, their organizations and themselves, in order that the public relations and also the internal relations of the organizations may be improved.

E. M. Walker of Terre Haute was elected president for the coming year, Harry Reid vice-president and Thomas Donohue of Lafayette secretary and treasurer.

Dean Cooley to Head American Engineering Council

ALTHOUGH most of the time was taken up with matters of routine character, there were a number of definite accomplishments by the executive board of the American Engineering Council of the Federated American Engineering Societies at its meeting in Washington Sept. 30. Mortimer E. Cooley, dean of the colleges of engineering and architecture of the University of Michigan, was elected president of the American Engineering Council to fill the vacancy created by the resignation of Herbert C. Hoover when he became Secretary of Commerce. It is understood that Professor Cooley has made arrangements which will enable him to give one-fourth of his time to active work for the organization. The board adopted a number of recommendations by the committee on government contracts.

Most attention was given the report of the special committee on employment service. From the discussion a resolution grew which points out the pressing need for a unified employment service for engineers "national in scope, local in application and financed for adequate service." It having been found that the constituent societies are not able to provide a free service, the executive board indorsed the principle of a paid employment service, but with reduced fees for members of the organizations that support it. A joint committee will organize the employment bureau.

A resolution proposed by W. W. Varney of Baltimore provided for the publication of a journal by the federated societies. Most of the members of the board were not prepared to vote on such an important matter as is involved in embarking in a pretentious publication activity. The proposed resolution was referred to the committee on printing.

After listening to the report of the committee on licensing the board felt that further work must be done.

Success Attends Metermen's Conference at Yale University

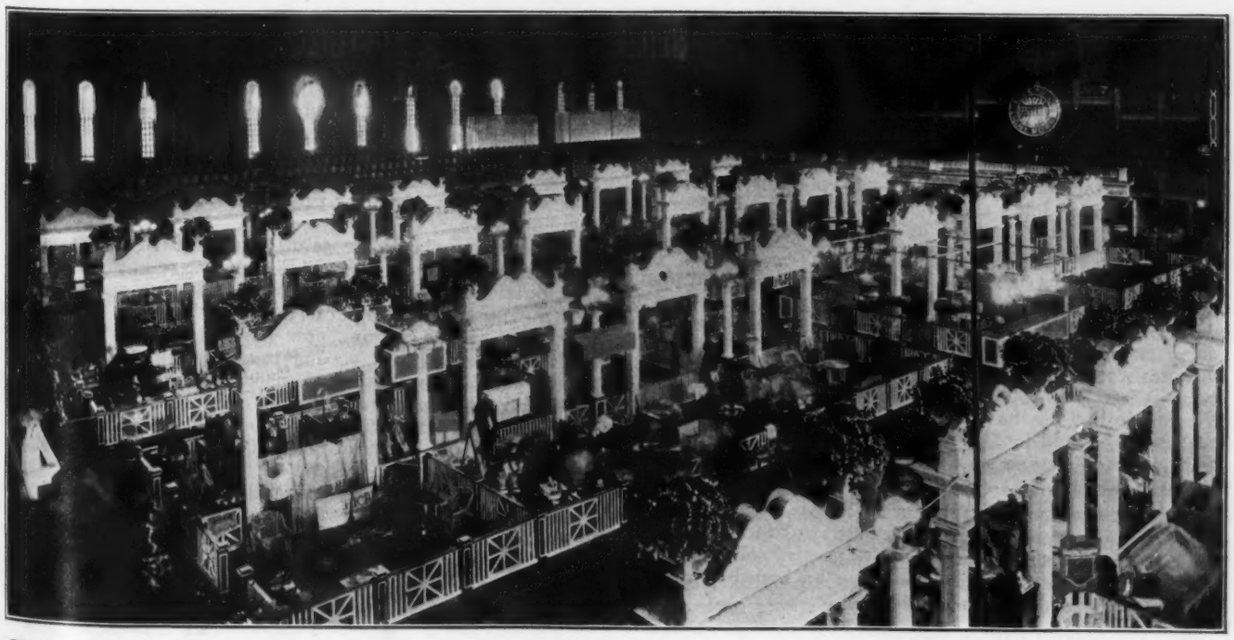
AN electrical metermen's conference was held at the Dunham Laboratory of Electrical Engineering of Yale University, New Haven, Conn., from Sept. 13 to Sept. 15. The attendance was more than thirty, including representatives from sixteen of the electric utility companies of Connecticut. The principal meter and instrument manufacturers were represented by one or more meter experts, and they, in conjunction with two members of the departmental teaching staff, provided the lectures and answered the questions asked in the subsequent discussion.

State Information Committee Idea as Conceived by Insull Growing

PROGRESS is still being made in widening interest in State committees on public utility information. According to the latest information available there are now eleven such committees covering sixteen states, the New England States being grouped under one committee. There are five other states that are making progress in this matter and others which have given it consideration.

The first committee was formed in Illinois and this month marks two and a half years of service. The general scheme for this committee was erroneously attributed in ELECTRICAL WORLD for Sept. 24 to John F. Gilchrist. It was conceived by Samuel Insull, president of the Commonwealth Edison Company. Mr. Gilchrist was made chairman of the original committee.

New York Electrical Show Draws 100,000 Visitors



ON SATURDAY night the fourteenth annual New York Electrical Exposition came to a close after ten days of large and enthusiastic attendance. It was estimated that fully one hundred thousand people thronged the spacious armory of the 71st Regiment, where the show was held this year. While there was great interest manifest in the demonstration of the wireless telephone and the amateur wireless contest, still the predominant interest shown by the public was in the domestic electrical appliances for lightening the labor of the home.

Emergency Measures for Non-Employment Held to Be Essentially Local

THE first phase of the work of the national conference on non-employment, meeting at Washington—namely, consideration of emergency measures of relief—was completed on Sept. 30, and the conference adjourned to meet again next Monday, Oct. 10. At that time the program will deal with long-time and permanent measures to prevent excessive shortage of employment.

Emergency relief, it was held, is essentially local in character, and with that in mind the conference adopted the following summary of its recommendations "for an emergency program for immediate adoption and prosecution":

1. The conference finds that there are, variously estimated, from 3,500,000 to 5,500,000 persons unemployed, and there are a much greater number dependent upon them. There has been an improvement, but pending general trade revival this crisis cannot be met without definite and positive organization of the country.

2. The problem of meeting the emergency of non-employment is primarily a community problem. The responsibility for leadership is with the mayor and should be immediately assumed by him.

3. The basis of organization should be an emergency committee representing the various elements in the community. This committee should develop and carry through a community plan for meeting the emergency, using existing agencies and local groups as far as practicable. One immediate step should be to co-ordinate and establish efficient public employment agencies and to register all those desiring work. It should co-ordinate the work of the various charitable institutions. Registration for relief should be entirely separate from that for employment.

4. The personnel of the employment agencies should be selected with consideration of fitness only and should be directed to find the right job for the right man and should actively canvass and organize the community for opportunities for employment. The registry for employment should be surrounded with safeguards and should give priority in employment to residents. Employers should give preference to the emergency employment agencies.

5. The emergency committee should regularly publish the numbers dependent upon it for employment and relief, that the community may be apprized of its responsibility. Begging and unco-ordinated solicitation of funds should be prevented.

6. Private houses, hotels, offices, etc., can contribute to the situation by doing their repairs, cleaning and alterations during the winter instead of waiting until spring, when employment will be more plentiful.

7. Public construction is better than relief. The municipalities should expand their school, street, sewage, repair work and public buildings to the fullest possible volume compatible with the existing circumstances. That existing circumstances are favorable is indicated by the fact that more than $700,000,000 of municipal bonds, the largest amount in history, have been sold in 1921. Of these, $106,000,000 were sold by 333 municipalities in August. Municipalities should give short-time employment the same as other employers.

8. The governor should unite all state agencies for support of the mayors and, as the superior officer, should insist upon the responsibility of city officials. He should do everything compatible with circumstances in expedition of construction of roads, state buildings, etc.

9. The federal authorities, including the Federal Reserve banks, should expedite the construction of public buildings and public works covered by existing appropriations.

10. A congressional appropriation for roads, together with state appropriations amounting to many tens of millions of dollars already made in expectation of and dependence on federal aid, would make available a large amount of employment.

The conference under existing circumstances, notwithstanding various opinions as to the character of the legislation and the necessity for economy, recommends congressional action at the present session in order that work may go forward.

11. The greatest area for immediate relief is in the construction industry, which has been artificially restricted during and since the war. We are short more than a million homes. All kinds of building and construction are far behind national necessity. The Senate committee on reconstruction and production in March of this year estimated the total construction shortage in the country at between ten and twenty billion dollars. Considering all branches of the construction industries, more than two million people could be employed if construction were resumed. Undue cost and malignant combinations have made proper expansion impossible and contributed largely to this situation. In some places these matters have been cleaned up. In other places they have not and are an affront to public decency. In some places these things have not existed. In others costs have been adjusted. Some materials have been reduced in prices as much as can be expected. Where conditions have been righted, construction should proceed, but there is still a need of community action in provision of capital on terms that will encourage home building. Where the costs are still above the other economic levels of the community there should be searching inquiry and action in the situation. We recommend that the governors summon representative committees, with the co-operation of the mayors or otherwise as they may determine, to (a) determine facts; (b) to organize community action in securing adjustments in cost, including removal of freight discriminations, and clean out campaigns against combinations, restrictions of effort and unsound practices where they exist, to the end that building may be fully resumed.

JOB ROTATION

12. Manufacturers can contribute to relieve the present acute situation by (a) part-time work, through reduced time or rotation of jobs; (b) as far as possible manufacturing for stock; (c) taking advantage of the present opportunity to do as much plant construction, repairs and cleaning up as is possible, with the consequent transfer of many employees to other than their regular work; (d) reduction of the number of hours of labor per day; (e) the reduction of the work week to a lower number of days during the present period of industrial depression; (f) co-operation with employees in putting these recommendations into effect.

A large number of employers have already, in whole or in part, inaugurated the recommendations herein set forth, and for this they are to be commended; and it is earnestly urged upon those employers who have not done so to put same into use, wherever practicable, at the earliest possible opportunity.

Specific methods for solution of our economic problems will be effective only in so far as they are applied in a spirit of patriotic patience on the part of all our people.

During the period of drastic economic readjustment through which we are now passing the continued efforts of any one to profit beyond the requirements of safe business practice or economic consistency should be condemned. One of the important obstacles to a resumption of normal business activity will be removed as prices reach replacement values in terms of efficient producing and distributing cost plus reasonable profit.

We therefore strongly urge all manufacturers and wholesalers who may not yet have adopted this policy to do so; but it is essential to the success of these measures, when put into effect, that retail prices shall promptly and fairly reflect the price adjustment of the producer, the manufacturer and the wholesaler.

When these principles have been recognized and the recommendations complied with, we are confident that the public will increase their purchases, thereby increasing the operations of the mills, factories and transportation companies and consequently reducing the number of unemployed.

Southeastern Section, N. E. L. A., Issues Tentative Program

FOR the coming meeting of the Southeastern Geographic Section of the National Electric Light Association, which will be held at the Signal Mountain Inn, Chattanooga, Tenn., on Oct. 17, 18 and 19, the following tentative program has been issued. In addition to the speakers scheduled it is expected that B. S. Cooper of the Alabama Public Service Commission will address the convention.

MONDAY, OCT. 17

Morning.—Address of welcome, Mayor of Chattanooga; response, Judge Lindsey, Knoxville, Tenn.; president's address, S. O. Irelan; address, M. H. Aylesworth, executive manager N. E. L. A.; report of overhead systems committee, W. K. Vanderpoel.

TUESDAY, OCT. 18

Morning.—Address, Martin Insull, chairman Public Relations Section, N. E. L. A.; address, F. D. Mahoney, Birmingham, Ala.; paper, G. A. Sawin, Westinghouse Electric & Manufacturing Company; paper, Mr. Turner, Edison Lamp Works.

Evening.—Paper, W. L. Goodwin, Society for Electrical Development; discussion.

WEDNESDAY, OCT. 19

Morning.—Address, M. R. Bump, president N. E. L. A.; address, T. W. Martin, Birmingham, Ala.; report of meter committee; election of officers.

Western Electric Separates Telephone and Supply Business

THE separation between the telephone business for the Bell Companies and the electric supply jobbing business of the Western Electric Company which has been in progress for some time is now practically completed. The telephone distributing houses and the supply distributing houses now have separate offices and organizations. The supply distributing department will have as general manager O. D. Street, while F. H Leggett becomes general manager of the telephone distribution.

In announcing this separation in the current issue of the company's house organ, *Western Electric News*, Charles G. Du Bois, president of the company, said:

Experience has shown that the natural territorial divisions for the two kinds of business are different and that the routines and methods best adapted to each are not at all the same. Moreover, in the personnel many have shown greater aptitude for one or the other kind of business and their natural tendency has been toward specialization in one or the other so far as was possible.

During all these processes the advantages of the close combination have been decreasing and the disadvantages have been increasing, and in fact the two departments have been gradually separating themselves by reason of their increasingly distinctive functions.

Fundamentally our telephone department is a service job for a relatively small number of companies. It calls for specialized knowledge in purchasing, warehousing, distributing, repairing (through the emergency shops maintained at the houses), disposing of returned material and other work peculiar to those companies' needs. It calls for a thorough knowledge of these telephone companies' requirements through an intimate contact with their operating officials. It demands also a familiarity with sources of supply, relationships with manufacturers, Hawthorne stocks and factory schedules, installation progress and many other details related to the continuous plant additions of the telephone companies.

The electrical supply business calls for a different sort of training. It has thousands of customers and is highly competitive in character. It calls for selling experience, knowledge of conditions in the trade, and a specialized efficiency in warehousing and marketing.

During the past twelve or fifteen years both divisions of our business have been steadily growing and our distributing facilities have been growing proportionately. These years have been naturally, too, a period for the development of men within our organization, and it has seemed clear that in dividing the business into its two logical parts better service could be rendered to both our associate telephone and our general supply customers by selecting at each distributing point a separate management specially equipped for each class of work.

Municipal Ownership Proposed for New York Railways

A "STATEMENT and outline" of its plan of readjustment for the New York City street railways, including subway and elevated lines, has been issued by the Transit Commission of that city, which has been working on the problem since its appointment by Governor Miller in accordance with the law reconstituting the public service commissions of the state that was passed at the last session of the Legislature. The following is a summary of its objectives:

(a) Municipal ownership of all railway lines in the city of New York.

(b) The surrender by the companies of all existing franchises, including perpetual franchises.

(c) The elimination of all existing agencies as factors in the transit situation.

(d) The unification of the entire transit system, with a board of control, three members to be appointed by the Mayor, three by the investors, and a chairman to be selected by the two groups.

(e) Operation to be carried on by three operating corporate agencies to be created for the purpose.

(f) Genuine home rule by the city in the administration of its transit affairs.

(g) The elimination of stock speculation in transit facilities by the elimination of stock.

(h) An honest valuation of all properties to be taken over by the city.

(i) Payment for such property to be made on the basis of such valuation, irrespective of present capitalization and book values.

(j) Municipal ownership to be acquired without outlay by the city, by retiring the purchase bonds out of revenues of operation.

(k) No increase of fare unless operation under the new conditions demonstrates its necessity.

(l) Rates of fare to be based on actual cost and automatically determined by the amount of a contingent reserve or "barometer" fund.

(m) Substantial economies in operation of the unified system through consolidation and the elimination of the numerous leasing and operating companies, with their unnecessary duplication of overhead, separate traction policies and independent purchases.

(n) Consolidation and unification of power facilities.

(o) The elimination of preferential payments to existing companies and the placing of the city's rights on the same footing with those of other interests.

(p) The assurance of a fair return on securities of the new system.

(q) The re-establishment of free transfers as rapidly as the financial condition of the new system will permit.

(r) The increase of the city's debt-incurring capacity so as to permit new subway construction.

(s) Proper and adequate service to the public.

(t) The rehabilitation of required lines, and the elimination of obsolete facilities.

(u) Participation by operating personnel, as well as new security holders, in surplus profits resulting from efficient management and operation.

(v) Useless or broken-down lines not needed in the public service not to be included in the system.

(w) Abolition of the Transit Commission upon the full establishment of the plan.

Current News and Notes

Timely items on electrical happenings throughout the world, together with brief notes of general interest

Tokyo Electric Company Donates 1,000,000 Yen to City.—A Japanese contemporary, *Denkinotomo*, says that at the last stockholders' meeting of the Tokyo Electric Light Company the president of the company announced, to the applause of the assembled security owners, that the company in commemoration of its twenty-fifth anniversary would donate 1,000,000 yen ($500,000 at normal exchange) to the city of Tokyo. The money will be expended for electrical research.

Venezuela Builds Wireless Stations.—Wireless stations which are expected to make up for the lack of adequate cable facilities between the United States and Venezuela are being erected in Caracas, Laguayra, Maracay, Valencia and other cities of the South American country. The Caracas station, it is said, is to have a long range and will be capable of communicating with similar stations in this country and Europe. The other Venezuelan stations, a number of which are already in operation, are to be employed in transmitting both official and private messages.

"Electrical" Fires Rage in England Also.—There was a great timber-yard blaze at Stratford, England, recently, and this fire, says the *Electrical Times*, "as every one might have anticipated, was probably due to 'the fusing of an electric wire.' That is what the evening papers said on the strength of a chance remark made by the proprietors. Whether or not there were any electric wires in the immediate vicinity of the outbreak matters nothing. If the point of origin was under the open sky, what of it? By a remarkable coincidence five thousand furious men had been hurling bricks through the office window that morning, a coincidence whereon it would be unworthy to dilate."

Electrification of the Most Northerly Railroad.—The most northerly railroad of the world—namely, that connecting the Bottnian Bay with the Atlantic Ocean—built for the transportation of iron ore, is now being electrified. The installation of this work is not an easy task, the average temperature at the town of Kiruna, the starting point of the road, being one degree above freezing and the lowest temperature 60 deg. Fahr. below zero. An order for eleven electric locomotives has been placed with the German Siemens-Schuckert company and the A. E. G. of Berlin. These locomotives will be the most powerful ever built in Europe. They will have to haul freight trains of 2,000 tons. The four motors of each of these engines have a total rating of 2,132 kw.

Quebec's Great Water Powers.—The vast hydro-electric potentialities of the Province of Quebec—estimated at from 6,000,000 hp. to 15,000,000 hp.—and the industries and activities that are served by the existing developments form the subject of a handsome special issue of the Toronto *Electrical News*, containing eighty pages of text and many illustrations. The Shawinigan Falls, Cedars Rapids and other plants serving the city of Montreal receive especial attention, and the statement is made on the authority of R. M. Wilson, chief engineer of the Montreal Light, Heat & Power Consolidated, that 750 kw.-hr. per capita per year is consumed in that city, as against 700 kw.-hr. in Toronto, 585 kw.-hr. in Buffalo, 450 kw.-hr. in New York and 250 kw.-hr. in Philadelphia.

Mr. Edison Investigates Hats.—Ascribing the industrial depression to a general spirit of timidity and unwarranted pessimism, Thomas A. Edison, talking to a New York *Times* reporter, said the other day: "We must get back to normal living and spending, forget our fears, our extravagances and our niggardliness, and live as if it were ordinary times. During the war America lost its head. Money was so plentiful, such high prices could be obtained for commodities, jobs paying such big wages so easily could be secured, that we fairly wallowed in extravagance. Then came the reaction, and we went to the other extreme. At the first cry of hard times, and as a token of rebellion against high prices, we went on a 'buyers' strike.' I attended a dinner last summer at which there were forty guests, all of them men of independent means. Noticing that the hats in the check room did not look particularly new, and having an inquisitive mind, I found out that twenty-nine of them were of last year's vintage. Naturally, the hat business has not been prosperous."

"Brown Coal" Versus "White Coal" in Australia.—Sir John Monash, chairman of the Electricity Commission of the State of Victoria, Australia, recently declared emphatically for the development of the "brown coal" mines at Morwell, in that state, as more economical than the alternative scheme of obtaining power by hydro-electricity. Brown coal, he said, could be produced at Morwell for about 5 shillings a ton and be available on railway sidings in Melbourne for 9 shillings. Briquettes would cost less than 20 shillings a ton, and electrical energy in the city would be obtainable at an average rate less than ½d. (1 cent) per kilowatt-hour. A capital expenditure of £3,500,000 on the scheme to develop water power at Kiewa was, he held, entirely unjustified, and it was sheer nonsense to speak of competition, which would mean the ruin of both schemes. The extent of the brown coal fields at Morwell, Sir John said, was 20 square miles, of which an area of one square mile had been selected containing sufficient fuel to last a hundred years.

Associations and Societies

A complete Directory of Electrical Associations is printed in the first issue of each month.

American Society for Testing Materials.—Important papers are, it is announced, to be read before this society on Oct. 28 and 29, when it will meet with the Providence Engineering Society at Providence, R. I.

Philadelphia Section, A. I. E. E.—This section will hold its first meeting for the new society year on Monday next, Oct. 10, at the Engineers' Club on Spruce Street. The speaker will be Frank B. Gilbreth, his subject being "One Best Way to Do Work."

Cincinnati Electric Club.—This club at its annual meeting elected the following officers: President, Leonard Trotter; first vice-president, Charles M. Beltzhoover; second vice-president, C. R. Eickelberger; secretary and treasurer, W. R. Keagy; directors, W. W. Freeman, J. A. Brett and W. J. Hanley. Reports of the retiring officers showed the progress the club has made in the last year in the promotion of the electrical industry, particularly in the field of industrial lighting.

New York Section, A. I. E. E.—In view of the success of the joint meetings held last year by the New York Section of the American Institute of Electrical Engineers and the Metropolitan Section of the American Society of Mechanical Engineers, it has been determined to continue and extend the idea in the coming Institute year. There will be six meetings of the electrical engineers. Four of these will be held jointly with the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers and the American Society of Mechanical Engineers, the dates being Oct. 19, Nov. 14, March 15 and April 19, and two with the A. S. M. E. only, on Dec. 14 and Jan. 27. The Oct. 19 meeting will have for its topic "Engineering Financing."

Coming Meetings of Electrical and Other Technical Societies

A. I. E. E., Philadelphia Section—Philadelphia, Oct. 10.

National Association of Railway and Utilities Commissioners—Atlanta, Ga., Oct. 11-14.

N. E. L. A., Southeastern Section—Chattanooga, Tenn., Oct. 17-19.

A. I. E. E., New York Section—New York, Oct. 19.

American Society for Testing Materials—Providence, Oct. 28 and 29.

A. I. and S. E. E., Philadelphia Section—Philadelphia, Nov. 5.

A. I. E. E. and Society of Naval Architects and Marine Engineers—New York, Nov. 17.

American Physical Society—Chicago, Nov. 25-26.

Electrical Supply Jobbers' Association, Atlantic Division—Philadelphia, date in November to be fixed.

Commission Rulings

Important decisions of various state bodies involving or affecting electric light and power utilities

Montana Commission's Powers.—The Public Service Commission of Montana has asserted its power to determine the jurisdictional fact of whether a business is rendering public service, notwithstanding that to do so involves judicial action or inquiry in the sense that the existence or non-existence of power is determined by the exercise of judgment on given facts.

Allocation of Property Between Towns Not Feasible.—In granting increased electric rates to the Missouri Gas & Electric Service Company, which serves seven small communities, the Missouri Public Service Commission declared that it was not feasible to allocate the property invested in transmission lines serving towns or cities of similar size and character and held that a unform rate in all the places involved was fair and not unduly discriminatory.

What Is Meant by "Historical Cost."—Finding fault with an estimate of $95,000,000 made by the Public Service Railway Company's engineers as representing the "historical cost" of the company's property, whereas it was the total cost of all the property ever constructed by the company for its use, much of which disappeared long ago, the New Jersey Board of Public Utility Commissioners defined "historical cost" as the cost shown by the records of so much of the property as is found in place at the time the valuation is made. In determining value based upon original cost it may be necessary to make certain deductions for accrued depreciation and certain additions for appreciation, but the result so obtained has reference to value and not at all to cost.

New York Commission Rules in Favor of Electric Company on Inductive-Interference Issue.—An application made to the New York Public Service Commission by the Hammond Light & Power Company for permission to construct a transmission line paralleling for 2½ miles the right-of-way of the New York Central Railroad was opposed by the railroad company on the ground of anticipated inductive interference and hazard from falling wires. It was shown that it was impossible for the light and power company to obtain a right-of-way further from the railroad, both sides of the adjacent highway being occupied by the railway's signal lines. These signal lines the proposed transmission line would parallel, but the commission authorized its construction, finding that "there will be little or no danger from inductive interference with the proposed voltage of 11,000 and the small amperage to be carried, and if the line is properly constructed, conforming with generally accepted standards, and properly maintained, there will be practically no danger from falling poles or wires."

Distance Factor as Affecting Rates.—In granting an increase of rates at Somerset, Wis., to the Interstate Light & Power Company, which supplies other communities also with energy developed by water power at the place named, the Wisconsin Railroad Commission said: "There does not appear to be any foundation supporting the contention that a city or village adjacent to a source of hydro-electric supply has a priority right over communities in more remote territory in the use of the electrical energy developed. It follows, then, that if a number of cities and villages can be connected at an expense not out of proportion to the revenues to be derived therefrom, every locality that is added will tend to reduce the unit cost of energy by apportioning the fixed costs over additional units sold. There is apparently no logical reason therefore why the power division should not be considered as a unit in determining the operating costs. While certain expenses can be definitely allocated to each community served by applicant, there are other joint costs which must be apportioned."

Basing Valuation on Investment.—The Public Utilities Commission of Maine in a recent utterance thus dealt with valuation principles: "Engineers, commissions and courts have been seeking a better method of valuation, and all of these agencies are now very seriously considering the ascertainment of an investment cost and using that as the foundation and perhaps the principal part of that which enters into the value. Otherwise stated, engineers seek to determine, either from records of the company or from records of prices and costs obtaining during the time when a particular plant was created, the amount which the company actually invested in the plant. The figure so obtained represents the investment which the company had originally in the property and the amount which it has since actually put in in money. It may be that to this amount should be added a certain sum in order to represent present value, but this method is regarded by many as more satisfactory than the reproduction method. If this method of valuation becomes the prevailing one, the public must understand that the return which the company is entitled to receive upon this value will vary, if figured in terms of per cent from year to year. If the public can be so educated that it will be assured that the value placed upon the property of the company is no greater than that which is fair and that the return figured in per cent must vary as the value of the dollar or the purchasing power of the dollar varies, then this method will probably be found the most satisfactory."

Recent Court Decisions

Findings of higher courts in legal cases involving electric light, power and other public utility companies

Interpretation of Arkansas Commission Law.—The Arkansas Supreme Court has held that, in the absence of any action by the state commission suspending rates filed by a utility, such rates become effective in thirty days without the need for affirmative action upon them by the commission. It has found also that rates so put into effect do not impair a contract specifying other rates because there can be no valid contract as against the power of public control by the commission. (232 S.W. 932.)*

Company Owes No Duty to Insulate Wires as Regards Trespassers in Tree.—Reversing a verdict for the plaintiff in McCaffrey vs. Concord Electric Company, the Supreme Court of New Hampshire found that a boy had no right, as one of the public, to climb a tree by the roadside unless he was climbing it in the exercise of the proprietary right of the adjoining owner, by the owner's request or express or tacit permission, and that therefore the company owed to a boy injured by its uninsulated wires while climbing such a tree no duty to prevent his injury, because the company, as a lawful occupant of such trees, owes no duty to a trespasser or bare licensee greater than that owed by the owners of the trees, and it is not bound to anticipate casual trespass thereon. (114 At. 395.)

Court Will Set Aside Rates Fixed by Municipality Only When They Are Clearly Confiscatory.—That rates fixed by a municipal ordinance require a company to supply small consumers at a loss does not render them invalid, the United States District Court for the Northern District of California held in an action brought against the city and county of San Francisco by the Pacific Gas & Electric Company to annul gas rates, if as a whole they produce a fair return. In determining what are fair and reasonable rates to be charged by a company a city council exercised a discretionary power, and since there are necessarily many elements of uncertainty in the valuation of property and in respect to other items to be taken into consideration, a court is authorized to substitute its judgment and declare such rates invalid only when they are clearly confiscatory, taking into consideration the fact that what is a fair rate of return on the investment differs in accordance with the factors of time and locality. (273 Fed. 937.)

*The left-hand numbers refer to the volume and the right-hand numbers to the page of the National Reporter System.

Men of the Industry

Changes in Personnel—Responsibilities and Association Appointments of Men Engaged in Professional, Executive, Operating and Commercial Branches of the Industry

A. H. S. Cantlin, who was elected president of the Pennsylvania Electric Association at its annual convention at Bedford Springs, Pa., is general manager of the Pennsylvania Power & Light Company, Allentown, Pa. Mr. Cantlin is a graduate of the University of Pennsylvania in electrical engineering. Soon after graduation he became

A. H. S. CANTLIN

associated with the St. Louis Transit Company as assistant electrical engineer. Later he joined the sales organization of the Electric Storage Battery Company, traveling in the Southwest. He returned to the central-station field as tester for the Missouri Edison Electric Company at St. Louis, one of the constituent companies of the Union Electric Light & Power Company. He resigned from this company to become electrical engineer with E. W. Clark & Company in Columbus, Ohio, and was later transferred to various properties of this firm until 1909, when he accepted the position of manager of the Allentown Electric Light & Power Company and its subsidiaries. Since that time he has made a thorough study of the field served and developed through the various consolidations and undertakings of this company, which is twenty-five times larger than it was at the time that he became connected with it. Mr. Cantlin has been an active worker in all the divisions of the Pennsylvania Electric Association and was chairman last year of the national association's committee on bonus systems, a subject to which he has devoted considerable attention.

Clark H. Minor, former manager of the China Electric Company of Pekin, has recently visited New York on his way to London, where he will become commercial manager of the Associated and Allied Companies of the International Western Electric Company in Europe.

H. Goodwin, Jr., who was associated with W. S. Murray in the Superpower Survey investigation during the past year, has opened an office in Philadelphia under the name of H. Goodwin, Jr. Associated with Mr. Goodwin in a partnership relation is E. M. Newlin, formerly also engaged in work of the Superpower Survey.

Dr. George Otis Smith, director of the United States Geological Survey, addressed the meeting of the New York State Oil Producers' Association at Olean on Sept. 21. His subject was the "Real Value of Oil." Dr. Smith also accepted an invitation to address the General Staff college of the army on Oct. 5 on the "Strategy of Minerals." Later in the course he will address the class on "Superpower."

Arthur H. Halloran, Pacific Coast representative of the McGraw-Hill Book Company, has resigned to become editor of the *Pacific Radio News* and president of the Pacific Radio Publishing Company of San Francisco. Mr. Halloran has had twenty-five years' experience in publishing work in both editorial and business capacities and was formerly managing editor of the *Journal of Electricity.*

D. W. Roper, who has recently been appointed chairman of the underground systems committee of the N. E. L. A., is superintendent of the street department of the Commonwealth Edison Company. Mr. Roper has for many years been identified with the work both of the N. E. L. A. and the A. I. E. E. He has been a member of the N. E. L. A. underground systems committee for several years and for two years has been chairman of the sub-committee on specifications and research, which was appointed jointly by the N. E. L. A. underground systems committee and the A. I. E. E. transmission and distribution committee.

Mr. Roper was born in Grafton, Ill., Oct. 18, 1869. He received his engineering education at Washington University and Cornell University, being graduated in the electrical course at the latter institute in 1893. His first connection with the electrical industry was with the National Electric Company, Eau Claire, Wis. He left that company to enter the students' course of the General Electric Company, Schenectady, and was associated with that company till the end of 1896, except for about six months during the winter of 1895-96, when he was a substation operator for the Niagara Falls Power Company soon after its first generator was installed. After leaving the General Electric Company, Mr. Roper entered the employ of the Missouri Edison Company in St. Louis, first in special testing work on arc lighting and single-phase motors, later as engineer of conduits. After about a year he received supervision of the underground-cable work and on completion of this work was made superintendent of electric apparatus. After four years with the Missouri Edison Company Mr. Roper resigned to take up consulting work. On May 1, 1903, he entered the employ of the Chicago Edison Company, and he has since been associated

D. W. ROPER

with that company and those which have succeeded it, making up the Commonwealth Edison Company.

Mr. Roper's first connection with the Chicago Edison Company was in the engineering department. When W. G. Carlton resigned to become connected with the New York Central Railroad, Mr. Roper was appointed assistant to the chief operating engineer as his successor. The duties included supervision of the underground department, conduit and cable division, as well as the central district of the overhead division of the Commonwealth Electric Company. Beginning in the summer of 1907 and following the consolidation of the Chicago Edison Company and the Commonwealth Electric Company into the Commonwealth Edison Company, the district organization of the Commonwealth Electric Company was abolished and departmental organizations were substituted. To Mr. Roper supervision of the overhead work of the three other districts of the Commonwealth Electric Company was given. With the growth of the company and the increase in importance of the underground and overhead work his duties gradually changed, so that on July 1, 1915, his title was changed to correspond, making him superintendent of the street department.

Mr. Roper has been a member of the A. I. E. E. since June 6, 1893, and a fellow since June 25, 1914. For five years he was chairman of the protective devices committee of the A. I. E. E., and for several years he has been a member of the transmission and distribution committee and the protective devices committee. At the time of the organization of the American Committee on Electrolysis Mr. Roper was appointed one of the representatives of the N. E. L. A., which appointment he still holds.

Kenneth A. McIntyre, vice-president of Beattie-McIntyre, Ltd., of Toronto, Canada, has joined the staff of the Society for Electrical Development. In the United States Mr. McIntyre will devote his time to the problems of the contractor-dealer, while in Canada he will specialize on field work among all

K. A. MC INTYRE

branches of the industry. Mr. McIntyre is well known on both sides of the border as an association worker. For more than nine years he has been engaged in the electrical business in Toronto. For the last three and a half years he has been vice-president of Beattie-McIntyre, Ltd., and has specialized in the contracting end of the business. His association activities have covered a period of more than five years. He was largely instrumental in organizing the Toronto Electrical Contractors' Association and was president of that organization before it expanded into the Ontario Association of Electrical Contractors and Dealers and became affiliated with the National Association of Electrical Contractors and Dealers. He still retains his chairmanship of the Ontario association as well as his financial interest in the firm of Beattie-McIntyre, Ltd., which company he continues to represent in association matters. For three years Mr. McIntyre has been the representative from eastern Canada on the national executive committee of the N. A. E. C. and D., and he is still a member of that committee. He is chairman of the architects' committee of the same association. He is also a member of the cost data committee of the national association and by means of a paper at the last Buffalo convention gave electrical contractors some exceedingly valuable data on installation costs.

E. J. Irish, manager T. J. Cope, Philadelphia, has resigned to go into business as a manufacturer of underground and overhead electrical supplies.

William McClellan, president of the American Institute of Electrical Engineers, has been appointed by Governor Sproul of Pennsylvania a member of the State Board for Licensing Engineers.

David C. Rosetahl, formerly general sales manager in the portable lamp department of the B. & K. Manufacturing Company, New Haven, Conn., has been appointed general sales manager of the Robert Findlay Manufacturing Company, New York City.

F. T. Whiting, manager of the engineering division of the Chicago office of the Westinghouse Electric & Manufacturing Company, has been appointed manager of the industrial division of that office, succeeding N. G. Symonds, who has been made manager of the office.

Charles E. Dustin, general secretary of the Associated Manufacturers of Electrical Supplies, New York City, is now able to return to his office. His friends are glad to know that he has recovered from the long siege of illness, lasting virtually ever since the last meeting of the association at New London.

Joseph B. Groce has been appointed director of the New England Bureau of Public Service Information and has established offices at 24 Milk Street, Boston. Mr. Groce was educated at Tufts College, graduating with the degree of A. B. in 1893. He engaged actively in newspaper work on the Boston *Transcript* and other publications for several years and later devoted about ten years to textbook publication work. For some time Mr. Groce was occupied in miscellaneous writing for newspapers and other periodicals. In 1918 he joined the staff of the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., and for two years served as general storekeeper in charge of supplies at the Quincy and Squantum plants. He then became attached to the office of the general manager and was in charge of industrial relations and service, during which time he established and edited the *Fore River Log*. He was later made vice-president of the industrial relations committee of the Atlantic Coast Shipbuilding Organizations. Last spring he left the company to engage in special writing for the Boston *Transcript*. The Bureau of Public Servce Information, as stated in the ELECTRICAL WORLD, represents leading electric, gas and telephone utilities in New England

J. B. GROCE

under the chairmanship of Howard T. Sands of Boston, and it is proposed through its activities to create and maintain the highest standards of mutual confidence between these utilities and the public of the New England territory.

Obituary

Morris S. Wright, president and general manager of the Pneuvac Company, Worcester, Mass., and head of the M. S. Wright Company, manufacturer of vacuum cleaners, died recently at Worcester. Mr. Wright was very prominent in the appliance manufacturing field and was in every sense a self-made man. He was born in Janesville, Wis., in 1859 and at the age of nineteen went to Worcester and entered industrial life, where he devoted many years to the development and manufacture of piano and organ actions, pneumatic player-piano actions and allied products. It is said that he was the first to control piano playing successfully by means of an electric motor. About fourteen years ago Mr. Wright turned his attention to the vacuum-cleaning field and after a year's investigation, during which he shut himself away from all interrupting business, he began manufacture. The product developed rapidly, and Mr. Wright's application of the worm-gear principle in driving a brush in conjunction with a suction mechanism led to the expansion of the company and its recent location in a new factory, said to be the largest in the world in its type of output. Mr. Wright was prominent in the social and religious life of Worcester as well as active in its business concerns. The affairs of the M. S. Wright Company will be carried on by the present organization, which includes the four sons of the late founder and chief executive, all of whom have been closely identified with the business ever since its inception.

Trade and Market Conditions

Business Reviews, Together with Market Letters from Important Trade Centers, on the Supply, Demand and Prevailing Prices of Electrical Apparatus and Supplies

Are Further Steel Advances Warranted at This Time?

ALTHOUGH the steel market has shown a decided decline in prices this spring and summer, the month of September saw a turn upward in several items, starting on Sept. 10 with an advance in wire quotations; sheets were advanced about a week later $5 a ton, and just before the month closed steel bars, plates and structural shapes went to a higher level. At that rate certain portions of the trade are looking for advances on other steel products.

Some of the low points were on quotations only a relatively short time, hardly long enough for the market to settle at those figures, before the reaction started. It is felt in many circles, however, that there has not been sufficient liquidation in the steel industry to warrant any decided upward trend and that generally higher levels would be a decided hindrance to the efforts being made on all sides to bring business as a whole to a point a little nearer than at present to covering the nation's needs.

The steel industry has increased its operations to a large extent during the past month, and in some mills activity to the extent of up to 60 per cent of capacity has been reported as against 35 per cent a month ago. Much of this is caused by business taken just before the higher rates on certain steel products went into effect.

Electrical Exports to Brazil Increasing Over Last Year's Rate

THE Brazilian market for electrical goods is improving, say cable advices to the Bureau of Foreign and Domestic Commerce. The whole commercial situation in Brazil has been steadied by the upturn in the demand for her exportable commodities. At the same time the exchange situation has been improved by the action of the Banco de Brasil in drawing against the second installment of the American loan and by the increased coffee bills in the market.

ELECTRICAL EXPORTS TO BRAZIL

	Twelve Months 1920	Seven Months 1921
Batteries	$189,582	$42,051
Carbons	23,963	6,220
Dynamos and generators	192,613	279,377
Fans	25,830	23,942
Heating and cooking apparatus	131,534	72,962
Insulated wire and cable	1,266,802	560,944
Interior wiring supplies	253,193	98,701
Arc lamps	117	
Carbon-filament lamps	6,371	10,698
Metal-filament lamps	465,451	274,160
Magnetos, spark plugs, etc	91,514	37,935
Meters and measuring instruments	131,621	84,775
Motors	448,131	519,057
Rheostats and controllers	21,395	49,006
Switches and accessories	207,275	108,714
Telegraph apparatus, including wireless	170,086	4,299
Telephones	407,768	219,850
Transformers	564,636	525,484
All others	1,353,245	1,072,034
Locomotives	389,714	837,246
Total	$6,340,841	$4,827,455

Exports of electrical materials from the United States to Brazil over the first seven months of this year are running at a very favorable rate. During this period they have amounted to $4,827,455, as against total exports for the whole of 1920 of $6,340,841. At this rate Brazil should import more than $8,000,000 in electrical materials from the United States in the whole of 1921.

Last year's exports were highest in miscellaneous equipment, insulated wire and cable, transformers, metal-filament lamps, motors and telephone equipment. So far this year miscellaneous equipment leads, with electric locomotives, insulated wire and cable, transformers and motors following in order. This year dynamos and generators, motors, rheostats and controllers and locomotives are well ahead of 1920 figures. The accompanying table was compiled by the ELECTRICAL WORLD from data submitted by the Bureau of Foreign and Domestic Commerce.

Lower Prices Affect Many Gas-Filled Type Lamps

EFFECTIVE Oct. 1, there was a general readjustment downward in the prices of the gas-filled type of "Mazda" lamps and of the same type of lamp manufactured under the new "United" trademark of several independent manufacturers. No general change was made in the vacuum-type prices, but the gas-filled have been lowered from 5 cents to $1.10, or from about 6 per cent to about 13 per cent, this range covering the various kinds of lamp. At the same time, the design of lamp and shape of filament was changed somewhat for the "Mazda" mill-type lamps, and the filament shape of the gas-filled lamps for train lighting service, pear-shaped bulbs, and the 200-watt daylight "Mazda" lamp for general lighting service are shown in different form.

The white "Mazda C" lamp is 5 cents cheaper at 60 cents; the 15-watt and 25-watt decorative lamps with medium screw base are also 5 cents lower at 60 cents, and the gas-filled lamps for general lighting service, 110-120 volts, are lower in different amounts, ranging from 5 cents to 80 cents for the clear lamp and from 15 cents to 90 cents for the bowl enameled, 75 watts to 1,000 watts. The greater amounts are on the larger lamps and the bowl-enameled types suffered a slightly bigger drop. The same kind of lamps for 220-250-volt service were reduced from 10 cents to $1 for the clear and from 15 cents to $1.10 for bowl-enameled. These 1,000-watt lamps took the highest reduction of any in price, but the percentage reduction was not the highest.

Five cents was taken off the 25-watt vacuum lamp of tubular bulb. For series street-lighting service the 4,000-lumen and 6,000-lumen, 6.6-amp. lamps were cut 50 cents, and the 15-amp. and 20-amp. lamps were cut from 50 to 75 cents. The gas-filled pear-shaped train-lighting lamps were lowered 5 cents, and the locomotive headlight lamps were cut 15 cents on the 100-watt size and 40 cents on the 250-watt size, the 150-watt size not being shown. "Mazda" daylight lamps for general service are off from 5 cents to 45 cents. From 5 to 10 cents was taken off the 28-32-volt lamp for farm service, type C. Concentrated-filament floodlight lamps were lowered from 40 to 50 cents. Stereopticon lamps, round bulb, were reduced 15 to 40 cents.

The fall trade seems to be picking up a bit in lamps. Lamp manufacturers have large stocks in factory and district warehouses, but all through the summer the distributers have been trying to get their stocks down to a minimum and have been ordering very lightly. Dealer stocks are not very large, and it is felt that they must soon make their demands known to cover their winter requirements. Lamp production is still far from plant capacity. It is expected that lamps for household use will not fall behind in demand this winter, but unless industrial work picks up the demand for gas-filled types will lag.

Carbon Lamp Exports Increasing in 1921 to Date

EXPORTS of carbon-filament lamps during the year 1920 amounted to $114,542. This represents only 2.75 per cent of all carbon-filament and metal-filament lamps for that year. Through the first seven months of the year 1921 exports of carbon lamps have amounted to $102,856. From this it would seem that the exports for this present year would surpass those of last year to quite a large extent. Exports in the year 1919 amounted to $202,597, or 4.3 per cent of the total exports of all incandescent lamps. While sales of carbon lamps in the United States have shown a steady decline in the last few years, it does not necessarily follow that the same thing will take place in the export field.

EXPORTS OF CARBON LAMPS IN 1920 AND 1921

	1920	1919
Mexico	$24,581	$14,337
Cuba	13,419	18,902
Canada	11,888	60,025
Argentina	7,023	2,475
Brazil	6,371	5,475
Philippine Islands	4,063	5,140
China	25	37,008
Australia	989	27,004
New Zealand	542	6,817

From the accompanying table of all the countries taking more than $5,000 in carbon lamps in the years 1919 and 1920, it is shown that while Canada was high in 1919, that country had fallen off greatly in 1920. Mexico was high in 1920 but only fifth in 1919. China, Australia and New Zealand fell off heavily in 1920. What country provided their supply to the extent of $70,000? These figures were compiled by the ELECTRICAL WORLD from data provided by the Bureau of Foreign and Domestic Commerce.

Insulated-Wire Prices Show Advance in Some Quarters

FOR the last week or more there has been a feeling in the trade that copper-wire prices were due for a rise, and some wire mills have just added about 5 per cent to their prices. Buying of this commodity throughout this year, however, has not been such as to warrant any rise in price, but within the last six weeks cotton prices have almost doubled and copper prices have strengthened. Along with higher cotton have come higher yarn prices. Spot cotton in New York early this week was 21.35 cents per pound, as against about 12 cents in the middle of August. It was during the latter part of that month that raw cotton started up, and it has held around 20 to 21 cents since.

Two-ply Southern chain warp, No. 20, during this period rose from about 23 cents a pound to about 37 cents a pound at this writing, an increase of 14 cents. Allowing about 3.3 lb. of cotton yarn per 1,000 ft. of No. 14 rubber-covered wire would mean an increased cost of 46 cents per 1,000 ft. due to cotton only at today's price. Bare copper wire base during this same period has been quoted as low as 13.25 cents net at the mill and is today quoted ¾ cent to 1¼ cents higher. On about 12 lb. of copper wire to 1,000 ft. of No. 14 rubber-covered wire a 1-cent increase in wire would add 12 cents to the cost. These are replacement costs at present figures.

Rubber has had no remarkable advance during this time, although it is slightly higher now. With two main items of raw materials higher, there is an effect on the other materials. Manufacturers who buy of these on a rising market must consider the purchase of the allied materials at that time—rubber, compound, whiting, etc.

Not all insulated-wire mills have advanced their prices at this writing, and although some jobbers have not done so, many others throughout the country have placed a higher price on rubber-covered wire this week. At the same time in many quarters this rise was anticipated and contractors and jobbers alike have covered their near-future needs by higher purchases during the last week.

Now a reaction is being felt in the flexible armored conductor field, and although no manufacturers have been found who have advanced their prices on this material, it would not be unexpected if a notification of higher prices should come in the near future. This action has also been anticipated in certain quarters.

Porcelain Insulator Prices Hold Firm in Quiet Market

ALTHOUGH prices on high-tension porcelain insulators of both the pin and strain types have been reduced only 10 per cent within the last year, there appears to be little likelihood of any further material reductions in the near future. Insulator manufacturers state that in their processes of manufacture it is essential that the personnel of the workmen be changed as little as possible in order to maintain a uniformly standard product. Reductions in labor costs have been very small, and these have been offset by increased charges for freight on both raw material and finished products. Comparison of present prices with those on a pre-war basis is difficult because of changes and developments in materials and design and the different requirements for both types of high-tension insulators.

The domestic market is fairly quiet. Most sales are small and appear to be for replacement and maintenance purposes. The electric light and power companies are making few long extensions, and this has naturally curtailed the demand. There is a market for high-tension strain insulators on the Pacific Coast, where some long-distance transmission lines are being built and others contemplated.

Foreign sales are holding up well, and manufacturers report that many European countries have a decided preference for American insulators because their serviceability has been demonstrated in actual practice here. In some countries German competition has appeared, but is not regarded as serious except in the case of insulators for the lower transmission voltages. One manufacturer reports a number of sales in Australia and Japan and states that European business is good. It is, of course, affected by adverse rates of exchange and other conditions abroad.

Metal Market Situation

CONTINUED strength still prevails in the copper market. Electrolytic is ¼ cent higher to 12.62½ cents a pound for spot, delivered, in the producers' market, and in the outside market it is ¼ cent higher than this price. November shipment is quoted at 12.75 cents and December at 12.87½ to 13 cents where any producers at all have been found who are willing to quote for December. Some producers have no more October copper under 13 cents. The outside market is not overburdened with copper. Copper wire, net, at the mill has advanced to 14 cents to 14.50 cents.

Buying has been on a pretty good basis the last week and inquiries from consumers are showing more interest, particularly wire manufacturers and brass manufacturers. The latter have been buying better too.

NEW YORK METAL MARKET PRICES

	Sept. 27, 1921	Oct. 4, 1921
Copper	£ s d	£ s d
London, standard spot	68 0 0	68 12 6
	Cents per Pound	Cents per Pound
Prime Lake	12.25	12.50 — 12.75
Electrolytic	12.37½	13 62½
Casting	11.75	12.25
Wire base	13.75	14.00 — 14.50
Lead, Am. S. & R. Co. price	4.70	4.70
Antimony	4.60	5.00 — 5.25
Nickel, ingot	41.00	41.00
Sheet zinc, f. o. b. smelter	10.00	10.00
Zinc, spot	4.87½	5.05
Tin, Straits	26.75	26.87½
Aluminum, 98 to 99 per cent	24.50	24.50

OLD METALS

	Cents per Pound	Cents per Pound
Heavy copper and wire	9.75 — 10.50	10.00 — 10.62½
Brass, heavy	4.75 — 5.00	4.75 — 5.00
Brass, light	4.25 — 4.50	4.25 — 4.50
Lead, heavy	3.50 — 3.75	3.50 — 3.75
Zinc, old scrap	2.00 — 2.37½	2.25 — 2.37½

THE WEEK
IN TRADE

Prices When Quoted Are Those Prevailing at the Opening of Business on Monday of This Week for Points West of the Mississippi River and on Tuesday for all Eastern Points

A SLOW but steady improvement is reported from virtually all sections of the country. Jobbers state that they are getting better orders from dealers and the industries are gradually getting back into better shape. Cotton mills in the South are running well and textile industries in New England are progressing. St. Louis reports better buying from the industrials in that territory than there has been in several months. Manufacturers in that territory report an increase in volume of their orders. Employment too is more satisfactory.

New York district jobbers have been taking larger orders and more of them this week, and there is better buying all around. Chicago is only about holding last week's activity, but with the acceptance by the Chicago Building Trades Council of the Landis award last Friday there is a more hopeful feeling for the fall months. Farm-lighting plants and farm high-tension switching equipment are reported moving well there.

Higher prices are being quoted on rubber-covered wire and on lamp cord in some quarters, while larger buying of this wire and of armored conductor has anticipated an advance in price.

NEW YORK

Larger orders, more of them and a generally firmer tone to buying marked conditions among the jobbers the past week. The increase in business from week to week has been gradual, and most jobbers feel that this is the best indication that a healthy improvement is well under way. The principal activity is seen in the standard items of wiring supplies, including conduit, wire, armored conductor and schedule material. In some lines it is believed that present prices are at the bottom, and there has been some large buying of wire and armored conductor.

With the return to standard time and longer evenings there has, of course, been a strong demand for lamps. At the same time, industrial lighting fixtures are moving, indicating some renewed industrial activity throughout this section. Among the heating appliances flatirons, toasters and air heaters are fairly active. The other appliances are moving slowly, although interest created by the Electrical Show has stimulated sales in the metropolitan district. Stocks of most lines are fair to good, but some shortage of curling irons and flatirons has been reported.

Collections have shown no change from last week. Jobbers report that most of their current credit sales are on a thirty-day to sixty-day basis.

Conduit.—No change in the price of this material was reported this week. The following prices were quoted by jobbers: For ½-in. black pipe in 2,500 ft. lots, $54.23 to $55; ¾-in., $69.92 to $70.79, and 1-in., $99.96 to $101.42 per 1,000 ft. Galvanized pipe in the same sizes was quoted at $59.33 to $62, $76.82 to $81 and $110.16 to $116 per 1,000 ft. Jobbers report that the demand is steady and orders have been for somewhat larger quantities but show no tendency on the part of contractors to lay in stocks. Most jobbers' stocks are good.

Flexible Armored Conductor.—Steady buying of this material continues and a number of sales of comparatively large quantities have been made. It is understood that in view of the increased cost of copper and cotton manufacturers of armored conductor are reluctant to accept orders at current prices for future delivery. No. 14, two-wire, single-strip, is quoted at $43 per 1,000 ft. in lots of that quantity and the double-strip at $44.50. Jobbers' stocks are fair.

Rubber-Covered Wire.—As a result of the rise in the prices of copper and cotton there was a noticeable stiffening in the quotations on rubber-covered wire this week. No. 14 in lots of 5,000 ft. is quoted at $6.35 to $6.60 per 1,000 ft. Demand is a little stronger, while jobbers' stocks generally are good.

Loom.—Prices remain as last quoted. In 1,000-ft. lots the 5/32-in. size sells for $19.25 and the ¼-in. size for $21 per 1,000 ft. It is thought possible that the recent increases in cotton may also affect this material.

Lamp Cord.—Demand is fair and jobbers report good to large stocks on hand. Prices this week are a little higher than those last reported. No. 18 cotton, twisted, is quoted at $12.30 per 1,000 ft. and No. 18 parallel at $14.90 per 1,000 ft.

Heaters.—Dealers are placing moderate orders for immediate delivery and jobbers report a fairly satisfactory activity on the heaters listing at $11.

Heating Appliances.—Flatirons and toasters still lead the heating devices in number of sales, although dealers find that the Electrical Show, which continues through this week, has increased their sales of other appliances. Jobbers report that buying is comparatively light.

CHICAGO

There has been little perceptible change during the past week. Although the disposition is still markedly in the direction of extreme caution and purchasing is largely confined to immediate requirements, more interest is being taken in future needs than at any time since the reaction set in last fall. The important event of last week was the acceptance on Friday night by the Chicago Building Trades Council of the Landis wage award. This was unanimous after the hoisting engineers had been expelled from the council for refusing to abide by the decision. The biggest obstacle in the building situation, it is felt, has thus been removed, though smooth sailing cannot be expected for some time to come.

The fall business in farm-lighting plants has started and is progressing fairly well. There is little fear of the stocks being depleted since dealers state they can supply all the demand calls for. There is also an increased demand for high-tension farm service equipment. Foreign inquiries for high-tension switching and protective equipment indicate that the American idea of standardized and interchangeable parts is appealing to purchasers. Lamps are beginning to move with their usual autumn speed.

Wire.—The market is a little firmer, with the base for bare wire still ranging from 15 to 15½ cents. The demand for rubber-covered wire is not very active. No. 14 is obtainable in 2,500-ft. quantities for $6 to $6.50 per 1,000 ft.

Flexible Armored Conductor.—This material has also strengthened a little, so that while stocks are fair the demand is unchanged. No. 14 two-wire double-strip is quoted at $50 per 1,000 ft. in lots of that quantity.

Rigid Conduit.—Quotations are unstable, a small price decrease being reported by some jobbers while others report no change. The demand continues fair and stocks are good in most sizes. The nominal quotation on the ½-in. black is $50 per 1,000 ft. in 2,500-ft. lots.

Lamp Cord.—This is quoted at $12 to $15 per 1,000 ft. for No. 18 cotton, twisted. Sales are keeping up fairly well and the demand is improving.

Lamps.—An increase of lamp sales to industrial companies and railroads has been reported. Dealers are ordering very little since their stocks are ample to meet demands.

Heating Devices.—Demand is increasing and excellent sales are recorded for air heaters. Stocks are ample to meet this demand.

Dry Cells.—The call for dry cells seems to be spotty. Several dealers report very little demand, while others report excellent sales, possibly because they handle radio

materials. The regular cell is priced at 31 cents in barrel lots.

Poles.—Prices on poles are still holding and stocks are heavy. The entire undertone is stronger, however, so that better business can be expected along this line.

BOSTON

Further improvement is reported in trade this week by leading jobbers and manufacturers' representatives. Stocks are still meeting demands satisfactorily, but occasionally a temporary shortage is noted owing to transportation delays or other causes necessitating shopping around to fill an order requiring immediate delivery. More material is moving through jobbers' hands than of late and inquiries are very active. Prices are unsettled in wiring-material quotations, and an advance this week was expected in rubber-covered wire and flexible armored conductor. Rigid conduit and some types of incandescent lamps, on the other hand, are softer in price. New England industrial activities are very encouraging in some lines, notably in cotton and woolen manufacture, where 80 per cent of capacity production is reported. Building and engineering contracts have increased to more than $4,000,000 for the last week reported, compared with about half that for the previous week. Retail trade is improving and collections are holding their own well.

Flexible Armored Conductor.—Improved sales are noted, with considerable activity Monday, anticipating a price advance expected by midweek. Jobbers quoted $46 to $47 per 1,000 ft. on No. 14 double-strip in 5,000-ft. lots, with ample stocks.

Lamps.—Increased activity is evident with the advent of shorter days, and the demand for mill-type and bowl-enameled units is noteworthy this week. Prices on many type C lamps were reduced Oct. 1 by from 6 to 13 per cent. Stocks are meeting the demand, but there is little opportunity at the moment to increase holdings of industrial units.

Motors.—A spotty market is reported this week, with good volume of inquiries and fluctuating sales. New designs entering the market are arousing interest, and sales engineers are very busy in survey and quotation work. Smaller sizes constitute most of the business, and prices seem to be reasonably stable.

Wire.—Rubber-covered No. 14 wire sold around $6 per 1,000 ft. in 5,000-ft. lots the first of the week, with open prices on large quantities. Buyers were rushing to cover Monday in anticipation of an advance to $6.75 for the above quantity and size expected a day or two later. Weatherproof wire is moving fairly well around 14 to 16 cents base, depending on quantity. Bare copper wire was quoted around 13⅞ to 14 cents base the first of the week, with relatively dull demand.

Non Metallic Flexible Conduit.—Prices show considerable variation between Boston and southern New England points, the former running from $1 to $3 lower per 1,000 ft. in 5,000-ft. lots. Better sales are reported, but no striking demand has yet appeared. Boston was charging $18 per 1,000 ft. on ½-in. loom Monday and $17.50 on ⅜-in., in 5,000-ft. lots. On "Nail-it" knobs, however, Boston was $18.50 per 1,000 in barrel lots, against $17.50 in southern New England.

Sockets.—Better building activity is moving these in greater volume. In case lots pulls are quoted 31½ to 33 cents net.

Lamp Cord.—Fair quantities are bringing $13 per 1,000 ft., quotations being made on a 15-cent base.

ATLANTA

Reports from jobbers on September business indicate a general improvement in the business tone throughout their line, orders being received from a constantly widening class of consumers. Christmas and holiday buying has just begun to make itself evident. Although industrials are still somewhat behind in their usual purchases, nevertheless very acceptable inquiries are being daily received and orders from textile mills that have been holding up on purchases for several months are reported as quite satisfactory. Bank clearings for the month of September in Atlanta amounted to $172,000,000, the largest in several months and approximately $30,000,000 over the clearings of June, July and August. Reports from manufacturers throughout the section show that cotton mills are back on full time with some operating on double time, while manufacturers of brick and clay products report a slight increase over prior months. A marked improvement is to be noted in the over-all manufacturing line, but other lines of manufacturers, while showing improvement over the past two months, state that their business is not up to conditions of a year ago. Building permits for September brought the number of new residences in Atlanta this year up to 982, which is the heaviest on record.

Schedule Material.—This line continues active, especially wiring devices required for the smaller stores and homes. Stocks are in good shape with no further change in price.

Lamps.—A price reduction of 6 to 13 per cent in type C was effectitve last Saturday. The 75-watt and 100-watt lamps of this type are particularly popular with industrials, and jobbers report a very satisfactory demand for the smaller sizes of the vacuum-type lamp, this demand being stimulated by the good movement in the fixture line. Heavy purchases by industrials for stocks are not yet in evidence.

Flexible Armored Conductor.—This has settled to a more even plane after the flurry of the past few weeks, and the movement has become less spasmodic, with resultant steadying in the price at $55 per 1,000 ft. Local stocks are in good shape.

Wire.—An increase of 10 per cent in the price of rubber-covered was effective last Saturday The movement of both weatherproof and rubber-covered has been exceptionally good during the last thirty days, nearly all sizes of rubber-covered being in considerable demand, while weatherproof in sizes No. 6 to No. 14 seem to be moving well. No change in the price of weatherproof is announced, though an increase would not be unexpected.

Flashlights.—The fall demand is beginning to show itself, and jobbers report an increasing movement in cases, batteries and lamps. No changes in prices are to be noted. Stocks are in excellent shape.

Heating Devices.—Orders are being received in increasing quantities from small dealers for hollow ware scheduled for delivery about Nov. 1. Flatirons continue to hold up well, and the entire line, air heaters excepted, seems to be getting into fairly satisfactory shape.

Vacuum Cleaners.—This line is showing a more satisfactory condition than any other specialties, sales having been very good for the past few weeks. Some orders are being received in anticipation of the holiday trade in this line.

Washing Machines.—Despite price reductions and campaigns, these continue dormant. In an attempt to stimulate sales several dealers undertook campaigns, but as yet they have met with little success. Heavy stocks are reported by all jobbers.

ST. LOUIS

Industrial buying of electrical goods is better now than it has been for some time. The entire industrial tone is improved. Stocks have been fairly well depleted, and with values liquidated to the point where they are remaining reasonably steady increased buying has resulted. Manufacturers in general report that the receipt of orders is more steady and that a good many calls are for rush shipment. For the first time in a number of months the labor situation in this district shows definite improvement, the percentage of employment being greater particularly in St. Louis, Louisville and Memphis. In St. Louis building shows some increase, but there remains the tendency to postpone construction until the costs are lowered. Railroad traffic is said to be increasing, but buying on the part of the railroads is still on a very reduced scale.

Returns indicate that the money situation in the agricultural districts will be good. The rapid advance in cotton

has enormously helped the South and corn is maturing well, with the bulk of the crop beyond the danger of frost. The quality of oats that were threshed is disappointing, but the results were up to government estimates. While the prices obtained are low, the cost of this year's crops was much lower than it was last year. The report of the Federal Reserve Bank of St. Louis states that the advance in cotton prices alone has added $56,000,000 to the purchasing power of this district.

Jobbers are experiencing a steadier demand for goods, and the volume of sales is increasing. Much cooler weather prevails and a better business in portables, lamps and air heaters has resulted. Rubber-covered wire also is moving faster.

Wire.—A stiffening in prices is found, though there is considerable variation in the prices of the various jobbers. In 10,000-ft. lots No. 14 rubber-covered is being quoted from $6.10 to $6.50 per 1,000 ft., one jobber advancing the base price on all rubber-covered wire from 14 cents to 16 cents. The base on bare and weatherproof has been advanced to about 14½ cents. Fairly heavy sales in rubber-covered are being made.

Lamp Cord.—Higher prices obtain, No. 18 cotton-covered twisted-pair selling for about $16 per 1,000 ft. The No. 18 silk-covered is priced at about $26. The cotton cord is showing some improvement in demand, but the silk is moving very slowly. Stocks are inclined to be heavy.

Knobs and Tubes.—Easier prices are found, "Nail-it" knobs being priced at $14.60 per 1,000 in barrel lots, a reduction of about $2.40, while some stand as high as $16.50; 2½-in. tubes are priced at $4.72 per 1,000 in barrel lots, and 3-in. tubes are selling for $5.12. Moderate to low stocks are the rule and demand shows healthy improvement.

Loom.—The last price reduction has not as yet given stimulus to sales and stocks are on a conservative basis. The ⅜-in. size is quoted at $17.75 per 1,000 ft. in 5,000-ft. lots.

Air-Heaters.—The advent of chilly weather has started sales to dealer and consumer, although dealers are placing their orders very conservatively. The retail purchasing appears to be about normal for the beginning of the season.

Sewing Machines.—Slow sales and heavy stocks are the rule. The motors are selling somewhat better, but far from normal.

Ironers.—Retail sales have been helped some by a special campaign giving better time-payment terms. Jobbers, however, report a quiet business. Stocks have been maintained fairly low.

SAN FRANCISCO

Business conditions, especially retail sales, are improving continually. As for electrical construction, San Francisco building permits for September show 100 per cent increase in value over those of August, while Los Angeles maintains its tremendous pace.

Washers.—Washer business in many makes is generally good, and a standardized selling method through regular solicitors and intensive effort is reported bringing good business wherever followed.

Dishwashers.—The Western Electric table-top dishwasher is now selling for $105, a cut of $50 from the previous price, which is expected to add considerable impetus to the present increasing volume of sales.

Radiators.—A San Francisco September "Home Industry" week produced good displays and increased the sales of heaters. A couple of weeks of exceedingly warm weather nipped in the bud a retail sale started by a few previous days of cold rain. From all indications the approaching season will result in excellent business for all types.

Lamps.—New prices, making an average reduction of 10 per cent on the type C "Mazda" lamps, are expected to increase the proportionate volume of sales of this type as compared with type B. Local fixture campaigns and selling effort are popularizing the use of fixtures requiring the type C lamps, but the quantities of type B lamps still on the dealers' shelves will somewhat retard this work for the next few months.

Ranges.—The Pacific Gas & Electric Company recently placed an order for a carload of electric ranges, and about the same time the Great Western Power Company also ordered a carload of ranges. The power companies and the dealers are now conferring over the best method of promoting these range sales. At the present time a strong sentiment seems to favor a system of selling which, while popularizing electric ranges with the public at large, will still give the dealers a good margin of profit.

SALT LAKE CITY—DENVER

A slight advance in price of both insulated and bare wires is taken by jobbers to mean a coming revival of construction activities and an indication of a return to stabilized business. Hopeful comment is both universal and persistent in merchandising circles, notwithstanding that there is little actual improvement in general conditions recorded for the past month. Few sizable line construction jobs are under way, but many projects are certain to be launched within the next six months, it is felt. Home building is proceeding at a good rate during the open fall weather.

Jobbers' stocks are still heavy in most lines, and appeals to dealers for relief are falling on deaf ears. The retail merchant has not yet broken away from the retarding practice of ordering stocks in small consignments. Most jobbers believe they have passed the acute stage of the depression era and that things are perceptibly on the upgrade. With farmers rapidly liquidating their crops, more money seems to be in circulation and credits are a trifle easier, but collections are still the bane of every man's business. There is a concerted effort among managers of the industrials to absorb a large percentage of unemployed labor. Many idle men are getting back to work, but usually on a decidedly reduced wage scale. The coal mines are running almost to capacity, and the metal mines, excepting the coppers, are securing a fair output. Air heaters and lamps are moving satisfactorily. Dealers are ordering well in these lines and stocks are good.

SEATTLE—PORTLAND—SPOKANE

Indications of a gradual improvement in business continue to multiply and are reflected in increased sales in most lines. Conditions throughout the Northwest are most encouraging. Crops have been unusually good, and exports from both Seattle and Portland were unusually encouraging during the month of September. Apples and lumber are being shipped in large quantities. September was a bumper month for Portland in shipping, building and banking. Wheat exports were 150 per cent greater than for September of last year. More than 1,000,000 bushels of wheat cleared out of Portland on Sept. 29, which is believed to be the record for any port in the world.

Strengthening of prices of lumber and shingles and an improved demand are creating a more optimistic feeling among lumber men. Lumber exports from all Northwest ports are heavy. Building in all lines in Portland has been exceptionally good, although building activity in Seattle is confined mostly to residence construction. Builders' hardware, plumbing supplies and electrical wiring equipment are all experiencing considerable activity due to residence building. Labor conditions, all things considered, are good, with the open shop prevailing for the most part, including the mines and waterfront in the Puget Sound region.

Electrical jobbers of Seattle uniformly report business in their lines as gradually improving. This is evidenced by increased volume of sales. No change in either credits or collections is reported. Stocks in all lines are ample. Only two important price changes have been noted in the past two weeks. Sockets have dropped about 30 per cent and rigid conduit has been reduced about 5 per cent. Portland jobbers report that orders coming in for standard-package quantities now indicate confidence on the part of buyers. Demand for wire, wiring devices and conduit is good, and the seasonal business in lamps and air heaters is active at the present time. Range and water-heater sales are holding up well as the central-station companies are carrying on an active range campaign.

Manufacturers' Activities

Devoted to the Business Side of Manufacturing, Distribution and Sales, News from Jobbers and Foreign Fields and a Record of New Devices and Trade Literature

Atlantic Division Jobbers' Meeting Again Postponed

Announcement is made that the fall meeting of the Atlantic division of the Electrical Supply Jobbers' Association has been postponed from Oct. 22 to the week of Nov. 28, the exact date not having been determined upon at this writing. The meetings will convene at the Bellevue-Stratford in Philadelphia.

Fixture Dealers' Market and Convention at Milwaukee

The third annual convention and the second joint convention of the National Council of Lighting Fixture Manufacturers, the Lighting Fixture Dealers' Society of America and the Illuminating Glassware Guild will be held at the Auditorium in Milwaukee, Jan. 30 to Feb. 4, 1922. It is expected that the morning sessions will be devoted to convention meetings and the afternoons to the fixture market. A "better-lighting week" will be held at the same time. This will include demonstrations of better lighting methods for the home, office and industrial plants. Surveys and reports on improvements possible in existing lighting installations will be a feature of the week and a "pageant of light," showing the progress of lighting fixtures and methods from the torch to the present-day fixtures, will be included.

Sieben Manufacturing Company in Its New Plant

The Sieben Manufacturing Company, manufacturer of the Sieben "All-in-One" electric washing machine, dryer and ironer, is now occupying its new location at 914 Genesee Street, Kansas City, Mo., and production is under way. The building is of brick, three stories and basement, with ample room for manufacturing, assembling and storing. Henry Sieben is president of the company and H. F. Walker is sales and advertising manager. The general offices are at 418 Gumpel Building.

New Merchandising Plan for "Buss" Plug Fuses

The Bussman Manufacturing Company, St. Louis, in developing a new guaranteed clear-window plug fuse has also put into effect a new merchandising plan. Working on the general assumption that the average domestic user of electricity has little knowledge of the use and workings of a plug fuse and carries in general few if any extra fuses, this company is now putting out ten of these clear-window plug fuses in a single carton. On this carton there have been printed simple but complete instructions concerning what a fuse is, why it is put in a circuit, what causes a fuse to blow, why it should not be tampered with, and why neither a fuse of the wrong size nor a temporary substitute should be used, how to tell if the circuit is overloaded, the right fuse to use, etc. The growing use of electrical appliances is one of the reasons for the development of this new service.

New Books on Bolivia and Colombia Issued by Commerce Department

The Bureau of Foreign and Domestic Commerce has issued new handbooks on two South American countries, covering trade, manufactures, finance, markets, etc. "Bolivia, a Commercial and Industrial Handbook," and "Colombia, a Commercial Industrial Handbook," may be had for 65 cents and 70 cents respectively, on application to any office of the bureau.

Beaven Takes Weber Agency in Southern States

Arrangements have been concluded by Henry D. Sears, 80 Boylston Street, Boston, general sales agent for the Weber Electric Company, wiring devices, with W. H. Beaven, Jefferson County Bank Building, Birmingham, Ala., for the latter to act as representative of Weber wiring devices in North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi, Arkansas and Louisiana.

Extension of Sales Financing Service

New York Contract Purchase Corporation Admits House Wiring Contracts Within Its Service by Buying These Accounts from Contractors

The New York Contract Purchase Corporation, 120 Broadway, New York City, extended its service to a limited degree during the past month, but on the same terms and conditions, to include the purchase of accounts arising from house wiring when done on the partial-payment plan. This corporation is one unit of a national organization affiliated with the General Electric Company and certain allied companies and is the outgrowth of the Utilities Investment Company, which commenced operations in Cleveland on Jan. 1, 1920.

Six of these contract purchase corporations have been formed in the United States to stimulate the sale of the product of the above-mentioned manufacturers by financing dealers through the purchase of the installment accounts arising from such sales. The plan is all based on the fact that electrical merchandise sales increase through the employment of installment payments, but many dealers are unable to finance long-term payments themselves or are unwilling to enter into negotiations with outside banking institutions.

The affiliated manufacturers and the appliances covered are: General Electric Company—motors, Tungar rectifiers, compensarcs and other appliances that are marketed through dealers; Edison Electric Appliance Company—Hotpoint, Edison and Hughes line of ranges and appliances, motor-driven and otherwise; Electric Vacuum Cleaner Company—Premier, Liberty and all other types of vacuum cleaners, including private brands; Hurley Machine Company—Thor line of washing and ironing machines, all types.

The New York Contract Purchase Corporation will buy outright from the dealer the installment accounts arising from the sale of the product of the above-named manufacturers, on the basis of a discount from the face value, determined by the length of time necessary for the account to pay up in full. The discount is 10 per cent plus a graduated discount varying from 4 to 8 per cent, covering payments taking up to twelve months. The dealer retains the down payment and sells the balance of the installment account to the corporation. Collection is accomplished through the dealer as agent, full completion of it carrying a 10 per cent commission for the dealer. No contract will be purchased on which the balance is under $30 or which will run over twelve months.

Recently house-wiring contracts have been added to the service, but not power-wiring contracts. Power motors of General Electric make are covered, however.

Besides the New York Contract Purchase Corporation, there are the Pennsylvania Contract Purchase Corporation, Witherspoon Building, Philadelphia; Ohio Contract Purchase Company, 1734 Ivanhoe Road, Cleveland; Illinois Contract Purchase Corporation, 28 East Jackson Boulevard, Chicago; Southwest Contract Purchase Corporation, Interurban Building, Dallas, Tex., and Pacific Coast Contract Purchase Corporation, 315 Mason Street, San Francisco. E. W. Miner is president of the New York and Ohio companies and vice-president of the others, with his offices in New York.

Gear Manufacturers to Meet Next Week

The semi-annual fall meeting of the American Gear Manufacturers' Association will be held in the Powers Hotel in Rochester, N. Y., Oct. 13, 14 and 15. The committees on standardization have various reports to offer, and a strong program has been arranged covering gear-tooth wear, tooth forms, grinding and gear materials. For the usual informal banquet the evening of Oct. 14 has been set aside. F. W. Sinram, Van Dorn & Dutton Company, Cleveland, is president and F. D. Hamlin, Earle Gear & Machine Company, Philadelphia, is secretary.

November to Be "Perfect Package Month" by Nation's Carriers

All trades and industries have been asked to co-operate in the "perfect package movement" to be inaugurated by the railroads, steamship lines and express companies in the United States and Canada in November, which has been designated as "perfect package month," according to a statement from the American Railway Association and the American Railway Express.

The purpose of the movement is to stimulate further public interest in good packing of shipments and to enable the carriers to improve the transportation service of the country. During November an examination of all shipments sent by freight or express will be conducted to obtain information as to the best shipping methods followed by the various trades and industries.

The entire working forces of the railroad and express carriers, comprising some 2,000,000 men, will aid in the movement. The railroads, through the American Railway Association, 431 South Dearborn Street, Chicago, are pushing the campaign as a means of raising the standard of the service, while the express agents are also getting ready to interest shippers in the undertaking.

American Building Exposition in Cleveland Next January

From Jan. 4 to Jan. 14 next the new Cleveland Municipal Auditorium will house the American Building Exposition, a complete building show for the encouragement of more and better buildings. It is a direct sales promotion plan for companies with plans and materials to sell, appealing intimately to the man about to build. The exposition is sponsored by the Builders' Exchange of Cleveland and is national in scope, with exhibitors and attendants from all sections.

Part of the exhibition floor will be given over to several cottages completed on the exterior and only partly completed on the inside, while the main exhibition floor will house all the interior material, decoration, finishing and furniture exhibits together with the contractors' and other machinery displays. The exposition will be under the direction of Ralph P. Stoddard, who managed the 1916 show, and Richard G. Collier will be assistant manager.

It may be of interest to note that last year Cleveland spent more than $78,000,000 for new buildings, and next year it is expected the city will exceed that. It is said that the builders hold more than 90,000 vacant lots in Greater Cleveland today.

Tulsa Chamber of Commerce Wants Catalogs

The engineering bureau of the Tulsa (Okla.) Chamber of Commerce desires catalogs of mechanical and electrical appliances, having in mind a catalog library for the use of engineers in that district where they can find any article listed in their respective lines.

Save Electric Corporation Purchases Toledo Factory

The Save Electric Corporation, manufacturer of incandescent lamps, at present at 220-254 Thirty-sixth Street, Brooklyn, N. Y., has purchased property fronting 100 ft. on Main Street and running back 390 ft. to the river in Toledo, Ohio. The first factory unit will be 70 ft. x 390 ft., two stories, with 50,000 sq. ft. of floor space, and additional units are contemplated as soon as operations in the first one are under way. The building itself will cost about $125,000 and will be equipped with about $200,000 worth of special machinery of the company's own make which is ready for shipment.

The Brooklyn plant has been operating at a capacity of about 20,000 lamps per day, and the opening capacity of the new plant will be for the same number, with space available to increase it up to 25,000 lamps per day. From 250 to 300 employees will be employed in this new plant. Distribution is effected through the corporation's manufacturers' representatives in fourteen cities and through its warehouses in San Francisco, Minneapolis, Chicago, New Orleans and Buffalo. The company is only about three years old. According to officials of the company, the output of the plant has been sold for about a year and a half ahead.

In its employment policies the company pays bonuses to its employees based on increased production and on reduction of shrinkage in manufacture. Max Ettinger is president and J. J. Steinharter is director of sales of the Brooklyn corporation. A new corporation will be formed with Eastern capital exclusively to operate the Toledo plant.

New Line of Industrial Supplies for Troy House

E. J. Van Doren announces the opening of his new office and sales room in the Times Building, Troy, N. Y., with an entire new line of direct-current, single-phase and polyphase motors, transformers, "Mazda" lamps and the "Air-dry" electric towel.

Aluminum Company Issues $18,000,000 in Gold Bonds

An issue of $18,000,000 of twelve-year, 7 per cent sinking fund debenture gold bonds has been authorized and already taken up by prominent banking corporations. The coupon bonds are in the denomination of $1,000 and are dated Oct. 1, 1921.

Arthur V. Davis, president of the Aluminum Company of America, in a letter states that the business conducted by the company and its subsidiaries was established in 1888 and consists of the mining of the ore of aluminum, the smelting of aluminum therefrom and its fabrication. The company owns large fabricating plants in which aluminum sheets, wire, tubes and other fabricated forms are made and also large water-power plants for the production of electricity required by its smelters.

"The proceeds of these bonds," says Mr. Davis, "will be used in part to provide funds for the retirement of $8,000,000 of the company's serial 6 per cent notes, of which $4,000,000 mature respectively March 1, 1922, and March 1, 1923, and to retire current indebtedness heretofore incurred for capital expenditures. The bonds will be direct obligations of the Aluminum Company of America and will be issued under a trust indenture carrying special provisions." These are specifically described in the letter.

"For the ten years ended Dec. 31, 1920, the net earnings of the company after interest, taxes, depletion, depreciation, etc., have averaged in excess of $10,000,000 per annum. For the seven months of 1921 ended July 31 net earnings available for interest before depreciation but after payment of 1920 income taxes (charged when paid against 1921 profits) were $2,648,698. The company has outstanding $18,729,600, par value, capital stock, which at present quoted prices indicate an equity of about $75,000,000 behind these bonds."

The California Electrical Co-operative Campaign has removed its offices to the Rialto Building, San Francisco, according to R. L. Eltringham, manager.

The Electric Heating Apparatus Company, 18-34 Nesbitt Street, Newark, N. J., has filed notice of increase in its capital stock from $20,000 to $70,000.

The Ralco Manufacturing Company, 849 West Washington Boulevard, Chicago, manufacturer of electrical railroad supplies, has purchased a one-story building, 100 ft. x 180 ft., at the corner of Lake Street and Albany Avenue, which it plans to occupy soon.

The B. B. M. Ice & Refrigerating Machine Company, incorporated under the laws of the State of Delaware with a capital stock of $225,000, has filed notice of organization to operate a plant at Detroit for the manufacture of machinery. Henry J. Berry, 702 St. Antoine Street, Detroit, is vice-president.

Foreign Trade Notes

PRICES OF ELECTRICAL GOODS IN SOUTH AFRICA HOLD.—Prices of electrical goods in South Africa have not as yet been materially reduced, according to the Western European Division of the Bureau of Foreign and Domestic Commerce, but the tendency is toward lower levels. Switches have been reduced from about 21s. to 18s. 6d. Other lines remain about the same. Almost complete inactivity is reported by dealers.

ELECTRIFICATION OF RAILROADS IN MADAGASCAR PROPOSED.—The Governor-General of Madagascar has decided to electrify the railroads of that colony from Tananarive to Tamatave, according to the *Commerce Reports*. A hydro-electric power station will be built on the Vohitra River to furnish a maximum power of 30,000 h.p. The length of the line is 150 km. and the total cost of the installations will reach 23,100,000 francs. Assistant Trade Commissioner F. G. Singer, who furnishes this information, states that the Governor-General is also considering the electrification of the future railroad from Diego-Saurez to Joffre Ville, a road about 35 km. in length.

NEW JAPANESE HYDRO-ELECTRIC PLANT.—The Imperial Railway Department of Japan is planning to construct a great hydro-electric plant at Niiagata Prefecture, using the water power of the Shinano River, states the *Far Eastern Review*, as quoted in *Commerce Reports*. The plant will have a capacity of 84,000 kw. and will operate a section of 200 miles of line. It is expected that it will be in operation in 1926.

Foreign Trade Opportunities

Following are listed opportunities to enter foreign markets. Where the item is numbered further information can be obtained from the Bureau of Foreign and Domestic Commerce, Washington, by mentioning the number:

A manufacturer in Italy (Nos. 81 and 36,189) desires to purchase cotton thread for electrical insulation.

A commercial agent from India (No. 84) who is in the United States has formed a partnership with an American business man and desires to secure the representation of manufacturers of boilers, pumps and small engines.

A firm of importers in India (No. 87) desires to form connections with firms for the importation of all classes of belting, power pumps, brass and copper tubes.

An importing company in India (No. 92) desires to secure an agency and purchase electrical appliances.

A representative of a Russian firm formerly doing business in southern Russia (No. 107) reports that he anticipates he will soon have an opportunity to re-establish his business in view of the changed attitude of the Bolshevik regime. He invites correspondence with manufacturers in the United States producing steam boilers, pipe fittings, water softeners, fuel economizers, and miscellaneous power-plant equipment.

New Apparatus and Publications

WASHING MACHINE—The Clements Manufacturing Company, 609 Fulton Street, Chicago, is marketing a machine with new features.

FOOD MIXER—The Air-O-Mix Corporation, 51 Beaver Street, New York City, has put on the market its "Air-O-Mix Whip-All" for kitchen and pantry use.

WASHING MACHINE — Improvements have been made in the electric washing machines of the Berthold Electric Manufacturing Company, 127 South Green Street, Chicago.

IRONER—The "Baby Grand" electric ironer is being manufactured by the Grand Manufacturing Company, Detroit, and distributed by the Electric Servant Company, Detroit.

WIRE AND CABLE—The American Insulated Wire & Cable Company, Twenty-first, Sangamon and Morgan Streets, Chicago, has completed arrangements for circulating the new leather-bound vest-pocket catalog on its "American Brand" wire and cable.

FRACTIONAL MOTORS—The Domestic Electric Company, Cleveland, has issued circulars 201, 202, 203 and 204, describing its various type of "domestic" fractional horsepower motors.

TABLE STOVE—The Standard Stamping Company, Huntington, W. Va., is manufacturng the Armstrong table stove and equipment.

EXPANSION BOLTS—The Star Expansion Bolt Company, 147 Cedar Street, New York City, has developed a new "Sebco" pressed-steel lag expansion shield.

CABLE SUPPORTS—Russell & Stoll Company, 17 Vandewater Street, New York City, has developed a new type of cable support for long vertical runs.

SUCTION SWEEPERS—"How to Judge An Electric Cleaner" is the title of the new twenty-four-page booklet of the Hoover Suction Sweeper Company, North Canton, Ohio.

AIR COMPRESSORS—A new automatic motor-driven air-compressor pump and tank, equipped with magnetic pressure release, has just been put on the market by Hobart Brothers Company, Troy, Ohio.

REFLECTORS—"Industrial Reflectors for Street Fixtures" is the title of the new bulletin of the Wheeler Reflector Company, 156 Pearl Street, Boston.

WASHING MACHINE—The Easiest Way Manufacturing Company, Sandusky, Ohio, has a new development in Washing machines.

PULVERIZED FUELS. — The Hardinge Company, 120 Broadway, New York City, has issued catalog No. 9, entitled "Pulverized Fuels."

POWER ACCESSORIES. — The Elliott Company, Jeannette, Pa., has just issued two new bulletins. N-1 is on the "Deaëration Process" as applied to power, central-station and heating plants to prevent corrosion, and N-2 is on the "Deaëration Process" for domestic hot-water service.

New Companies

THE INTERNATIONAL SPECTACLE COMPANY, New York, N. Y., has been incorporated by D. Hines, L. McCormick and J. L. Gorman. The company is capitalized at $500,000 and proposes to manufacture electric lighting equipment and fixtures. C. M. Rubanks, 50 Pine Street, represents the company.

THE CARBON BATTERY & ELECTRIC COMPANY, Lansford, Pa., has been incorporated with a capital stock of $5,000 to manufacture and deal in electrical equipment. Milton Kleckner, Lansford, is treasurer.

THE PARCOL INDUSTRIES, INC., Alpena, Mich., has been incorporated by H. H. Campbell and George K. Parsons, Alpena, and H. J. Collins, Pontiac. The company is capitalized at $50,000 and proposes to manufacture electrical appliances and equipment.

THE PROVIDENCE (R. I.) RADIATOR & ELECTRIC HEATING CORPORATION has been incorporated under the laws of the State of Delaware with a capital stock of $2,000,000 to manufacture electrical and mechanical products. The incorporators are Daniel Owen, P. S. Howland and M. A. Colter, Boston. The company is represented by the Delaware Registration Trust Company, 900 Market Street, Wilmington, Del.

THE EDISON FIXTURE COMPANY, Boston, Mass., has been chartered with a capital stock of $5,000 to manufacture electric fixtures and other electrical equipment. The incorporators are Caesar Heyndricks, 37 Shurtleff Street, Chelsea, Mass., and Harry E. Kidd. Boston.

THE CAZENOVIA (N. Y.) TELEPHONE COMPANY has been organized with a capital stock of $100,000 to operate a local telephone system. The incorporators are M. R. Joy, A. B. Carpenter and H. Gurden. The company is represented by B. H. Shepard, Syracuse.

THE EVERETT (MASS.) ELECTRICAL COMPANY has been incorporated with a capital stock of $50,000 to manufacture electrical equipment. The officers of the company are Roy C. Blackburn, president, and Michael F. Cullinev, 15 Olney Street, Dorchester, vice-president and treasurer.

Record of Electrical Patents

Notes on United States Patents

(Issued Sept. 6, 1921.)

1,389,829. METHOD OF ELECTROLYZING A SOLUTION OF NICKEL SALT; Christian Heberlein, London, England. App. filed Dec. 7, 1918. Deposition of metallic nickel from nickel salt.

1,389,831. ELECTRIC LIGHT CHANDELIER; Sidney M. Israel, Richmond Hill, N. Y. App. filed Aug. 4, 1920. Concave-convex plaque with several bracket arms.

1,389,871. APPARATUS FOR CHARGING STORAGE BATTERIES; William R. Hersh, Dayton, Ohio. App. filed April 12, 1920. Will automatically disconnect batteries when they have received a charge.

1,389,895. ELECTRICAL SIGNALING AND INDICATING DEVICE FOR SHIPS AND OTHER VESSELS; Rodolph S. O'Neil, London, England. App. filed Oct. 27, 1920. Lamps illuminated in differing orders of succession.

1,389,902. TELEPHONE INSTRUMENT OR THE LIKE; Oscar A. Ross, New York, N. Y. App. filed April 26, 1918. Telephone stand.

1,389,914. ANTISEPTIC MOUTHPIECE FOR TELEPHONES; Frank C. Tabler, St. Louis, Mo. App. filed Nov. 17, 1919. Applicable for use upon transmitters of all forms.

1,390,001. SIGNALING OR INDICATING APPARATUS; Paul H. Waller, Camberwell, London, England. App. filed Dec. 10, 1919. Station indicator for vehicle.

1,390,017. RECORDING-LOCK SYSTEM; James W. Bryce, Binghamton, N. Y. App. filed July 16, 1919. Records time at which lock was operated.

1,390,018. MASTER CLOCK; James W. Bryce, Binghamton, N. Y. App. filed Aug. 24, 1920. Synchronous clock system.

1,390,028. ELECTRIC KETTLE AND THE LIKE; Allen S. Ford, Taunton, England. App. filed March 24, 1920. For heating liquids by electricity.

1,390,039. ELECTRIC BULLETIN; Ralph E. Jones, U. S. Army. App. filed Aug. 8, 1918. Bulletin board.

1,390,050. TRANSFORMER; Corliss E. Lee, Pittsfield, Mass. App. filed Sept. 10, 1917. Polyphase transformers and reactors.

1,390,062. POWER PLANT; Arthur R. Smith, Schenectady, N. Y. App. filed Dec. 15, 1920. Steam turbo-generator sets.

1,390,063. WINDING FOR DYNAMO-ELECTRIC MACHINES; Henry W. Taylor, Bilton, England. App. filed Dec. 9, 1920. Armature winding for alternating-current machines.

1,390,064. WINDING FOR DYNAMO-ELECTRIC MACHINES; Henry W. Taylor, Bilton, England. App. filed Dec. 9, 1920. Armature winding for alternating-current machines.

1,390,070. LAMP; Gustave E. Villaret, New York, N. Y. App. filed Dec. 11, 1920. To illuminate room and give diffused light for reading.

1,390,074. CONSTANT-CURRENT TRANSFORMER; Lyman Arnold, Lynn, Mass. App. filed March 14, 1918. Movable-winding type.

1,390,118. INSULATOR; Peter C. C. Fridrichsen, Wheeling, W. Va. App. filed June 16, 1919. Insulating knob.

1,390,119. CROSS-OVER FOR TOY RAILWAYS; Albine Frohne, Chicago, Ill. App. filed May 31, 1921. Trolley contactors will not become grounded at crossover.

1,390,120. TROLLEY CONTACTOR; A. Frohne, Chicago, Ill. App. May 31, 1921. For toy electric railroads.

1,390,155. ELECTRIC ACCUMULATOR; Albert Nodon, Bordeaux, France. App. filed Nov. 9, 1918. No buckling.

1,390,192. ELECTRIC COMMUTATOR; Pierre Bossu, Paris, France. App. filed Nov. 14, 1917. Commutators of great strength.

Construction News

Projects, Plans, Bids and Contracts, Contemplated or Under Way

New England States

HOLBROOK, MASS.—Steps have been taken by H. W. S. Roberts, Selectman, to have the overhead wires in Post Office Square placed underground.

Middle Atlantic States

BUFFALO, N. Y.—The Buffalo Light & Power Company, recently organized with a capital stock of $20,000 by F. Edward Walker and others, has awarded contract for the construction of a power plant, 20 ft. x 36 ft., of 100-hp. capacity to C. Benton. The company, it is understood, is asking for prices on electrical equipment and supplies. S. R. Woodward is engineer.

CAMBRIA, N. Y.—The Cambria Power Company, Inc., Sanborn, has been authorized to construct an electric light and power plant in Cambria.

LOCKE, N. Y.—The Moravia (N. Y.) Electric Light, Heat & Power Company, not the Empire Gas & Electric Company as previously reported, will construct a line to Locke as soon as the franchise and permit from the Public Service Commission are granted. Lewis C. Reynolds, treasurer of the Moravia Company, with offices at 387 Castle Street, Geneva, N. Y., is in charge of the work.

MARILLA, N. Y.—Permission has been granted to the Depew & Lancaster Light, Power & Conduit Company to extend its electric system to the town of Marilla.

SOUTH COLTON, N. Y.—The Racquette River Power Company, Potsdam, has been granted a certificate of public convenience by the Public Service Commission for the construction of a hydro-electric power plant on the Racquette River at South Colton, to furnish electricity for light, heat and power throughout the Colton Township.

PHILADELPHIA, PA.—The Mayer Baking Company, Sixtieth and Hazel Avenues, is contemplating the construction of a power plant in connection with its proposed baking plant on Thomas Avenue, to cost about $140,000.

PITTSBURGH, PA.—Preliminary plans are under way by the Duquesne Light Company for a new electric plant in the Bellevue district.

SUNBURY, PA.—The Butter Krust Baking Company is planning the construction of a new plant, 70 ft. x 130 ft., to cost about $150,000. Ovens, conveyor system, power apparatus and other mechanical equipment will be required.

FRANKFORD, DEL.—The City Council is considering the installation of an electric light plant in Frankford.

DANVILLE, VA. — Arrangements are being made by the Council to issue bonds to the amount of $10,000 for the installation of an electric lighting system.

North Central States

NORTH ADAMS, MICH.—Bonds to the amount of $5,000 have been voted for the erection of a transmission line from Hudson to North Adams. The local authorities have decided to abandon the operation of the municipal light plant.

MARIETTA, OHIO. — Plans are under way for the construction of a hydro-electric power plant for municipal service. Bids, it is understood, will be asked at an early date by G. H. Gampers, engineer, 220 New First National Bank Building, Columbus.

ZANESVILLE, OHIO — The Zanesville Provision Company is contemplating an addition to its main plant and the construction of a new power plant.

ZANESVILLE, OHIO — Improvements and extensions to the local power plant of the Ohio Electric Railway Company, to cost about $100,000, are under consideration.

CANTON, ILL.—Arrangements have been made by the Canton Gas & Electric Company for the erection of an electric transmission line from Dunfermline to East Liverpool.

CLINTON, ILL.—The Board of Supervisors of Dewitt County is contemplating the installation of an electric light plant at the county farm.

ANTIGO, WIS.—Plans are under consideration by the Wisconsin Traction, Light, Heat & Power Company, Appleton, for the development of the power plant site on Wolf River at Gardner Dam to furnish 12,000 hp. The company also plans to erect a transmission line to Antigo.

FOND DU LAC, WIS.—The Galloway-West Company, 24 West Division Street, is having plans prepared by Martin Tullgren & Sons, architects, 425 East Water Street, Milwaukee, for a four-story addition, 60 ft. x 160 ft., to its cold-storage warehouse and dairy products plant in Fond du Lac. Generating, boiler and refrigerating equipment will be required. M. E. West is manager.

GLASGOW, MO.—The Kansas City Light & Power Company, it is reported, is planning the construction of a light and power plant at Glasgow, to cost about $1,000,000.

ST. LOUIS, MO.—The Union Electric Light & Power Company is planning an expenditure of $1,000,000 for improvements.

MADISON, NEB.—Plans are under way by the Henningson Engineering Company, National Building, Omaha, for the construction of a new municipal electric power plant in Madison, to cost about $75,000. Bids will soon be received by the engineers.

Southern States

SWANSEA, S. C.—Bonds to the amount of $20,000 have been voted for the installation of electric lighting in Swansea.

MACON, GA.—The plant of the Central Door & Sash Company was recently destroyed by fire, causing a loss of about $150,000, including machinery, power equipment, etc.

TUSCALOOSA, ALA.—Plans are under way by the Bonnie Coal Company, recently organized, for the installation of an electric power house and other mechanical equipment at its properties. C. C. Huckaby, Blocton, is consulting engineer in charge. William Jones is president and manager.

STARKEVILLE, MISS.—Bids will be received by the State Bond Improvement Commission, Jackson, until Oct. 15, for furnishing two 200-kw. alternating-current generators, direct-connected to steam engines or turbines; two stage air compressors of 700 cu.ft. displacement, direct-connected to synchronous motor; two centrifugal pumps of 600-g.p.m. capacity against 150-ft. head, and one centrifugal pump of 50-g.p.m. capacity against 50-ft. head, also single-acting triplex plunge feed-water pump, 40-g.p.m. capacity, all connected to three-phase induction motor; duplex outside end packed plunger, pot valve, feed-water pump of 70-g.p.m. capacity at 30 strokes per minute; two 8-in. and 10-in. x 12-in. vacuum pumps for heating system; ice-making plant complete except pans and distilling system, capacity 7½ tons per 24 hours; castiron stack type, open feed-water heater for approximately 1,200-hp. boiler capacity; closed-type hot-water supply heater with 2,500-gal. hourly capacity, storage space for about 900 gal.; ten-panel black marine-finish slate switchboard; radial-brick or concrete chimney, 7 ft. inside diameter at top and 150 ft. high above top of foundation, at Mississippi A. & M. College, Starkeville. Theodore C. Link, Box 636, Jackson, is supervising architect.

FAIRLAND, OKLA.—The construction of a municipal light and power plant is under consideration. H. T. Olmstead & Company, Oklahoma City, are engineers.

SAYRE, OKLA.—Bids will be received Oct. 25 for waterworks, light and sewer extensions and power plant. The plans provide for one mile of water mains, two 300-g.p.m. motor-driven pumps, one 500-g.p.m. marine-engine fire pump, one 75-kva. and one 125-kva. oil engine-generator set, etc. V. V. Long & Company, 1300 Colcord Building, Oklahoma City, is consulting engineer. E. Simmonds, Sayre, is city clerk.

MEXIA, TEX.—The Mexia Refining Company, Telephone Exchange Building, has awarded contract for the construction of its new oil refinery to Charles B. Miller & Company, Fort Worth. The cost is estimated at $300,000, of which $150,000 will be expended on machinery. A new power house will also be built.

Pacific and Mountain States

SEATTLE, WASH.—The Washington Coast Utilities Company has filed notice of increase in its capital stock from $300,000 to $1,000,000.

FAIRFIELD, CAL. — Estimates of the cost of the installation of a lighting system are being prepared by the Fairfield Chamber of Commerce.

MERCED, CAL.—Plans and specifications have been adopted by the city trustees for the installation of a complete electrolier system, to cost about $300,000. The present plans provide for 460 electroliers.

OROVILLE, CAL.—Announcement has been made by Lars Jorgensen, chief engineer, and Karl Brehme, vice-president and financial manager of the Middle Fork Development Company, of San Francisco, that arrangements have been made for financing a 201,000-hp. hydro-electric and irrigation project on the Middle Fork of the Feather River, to cost about $30,000,000. The proposed scheme includes three storage reservoirs and three major plants of 60,000-hp. generating capacity each, to be built at Nelson Point, Crooked Bar and Bear Creek. Three smaller plants are also planned, but sites have not yet been located. All work prior to building the power plant will be done by the Middle Fork Development Company and the Constant Angle Arch Dam Company. Application has been made to the Federal Power Commission for a permit to proceed with the hydro-electric development.

SAN ANDREAS, CAL. — The County Supervisors have authorized the formation of the Murphys Lighting District. M. H. Manuel is one of the trustees of the district.

TURLOCK, CAL.—Plans have been accepted by the joint boards of the Turlock-Modesto Irrigation Districts for the construction of a power house and the installation of machinery, to cost about $1,500,000, at the Don Pedro Dam. The plans provide for an initial capacity of 16,000 hp. and an ultimate development of 45,000 hp. A. Wiley is consulting engineer, Percy Jones is chief of the Modesto District.

MISSOULA, MONT.—The Rock Creek Power Company has been granted a license by the Federal Power Commission for water-power rights on Rock Creek. The present plans provide for the construction of a power house, diversion dam, 3-mile conduit, etc. John Shaunessy is interested.

PUEBLO, COL.—Bids will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until Oct. 21, for repairs to the lighting system, etc., in the U. S. Post Office at Pueblo. Copies of specification and drawing may be obtained at the above office or at the office of the Custodian, Pueblo, Col. James A. Wetmore is acting supervising architect.

Canada

AMHERSTBURG, ONT.—The construction of a power station at Amherstburg is under consideration by the Hydro-Electric Power Commission of Ontario.

CREDITON, ONT.—The installation of a new electric light and power distribution system in Crediton, to cost about $33,000, is under consideration. J. N. Wilson, 190 University Avenue, Toronto, is engineer.

TECUMSEH, ONT.—The Hydro-Electric Power Commission of Ontario contemplates the erection of a power station at Tecumseh.

TORONTO, ONT.—A bylaw has been authorized by the City Council providing for the raising of $750,000 for extensions and improvements to the municipal electric power plant.

WEST VANCOUVER, B. C.—The Municipal Council is contemplating the installation of an electric light and power plant, to cost about $150,000. James Ollason is clerk.